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PUBLICATION

The Iron Age

THE NATIONAL METALWORKING WEEKLY

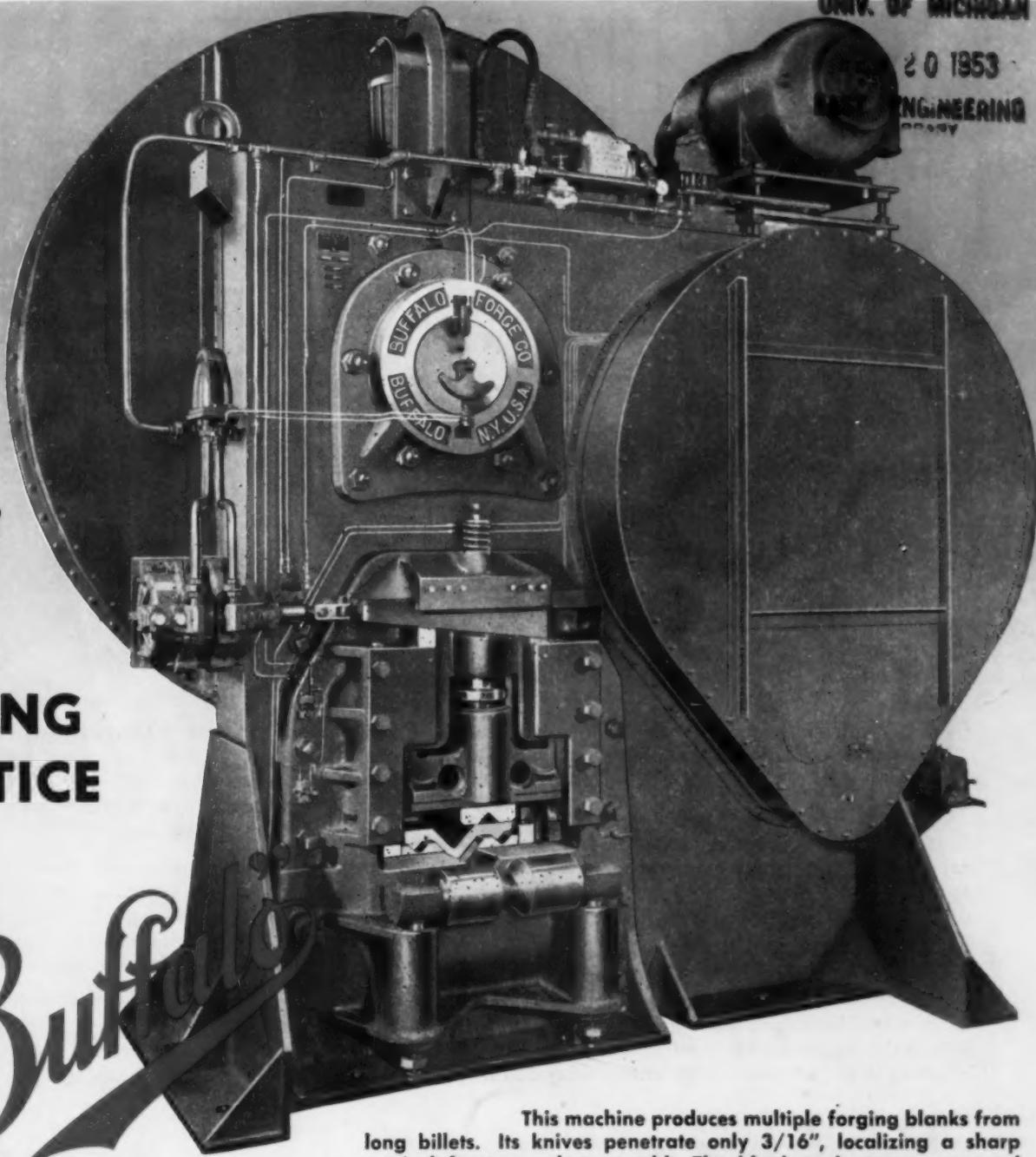
February 19, 1953

MENTS PAGE 2

UNIV. OF MICHIGAN

20 1953

MACHINING
ENGINEERING
DEPARTMENT



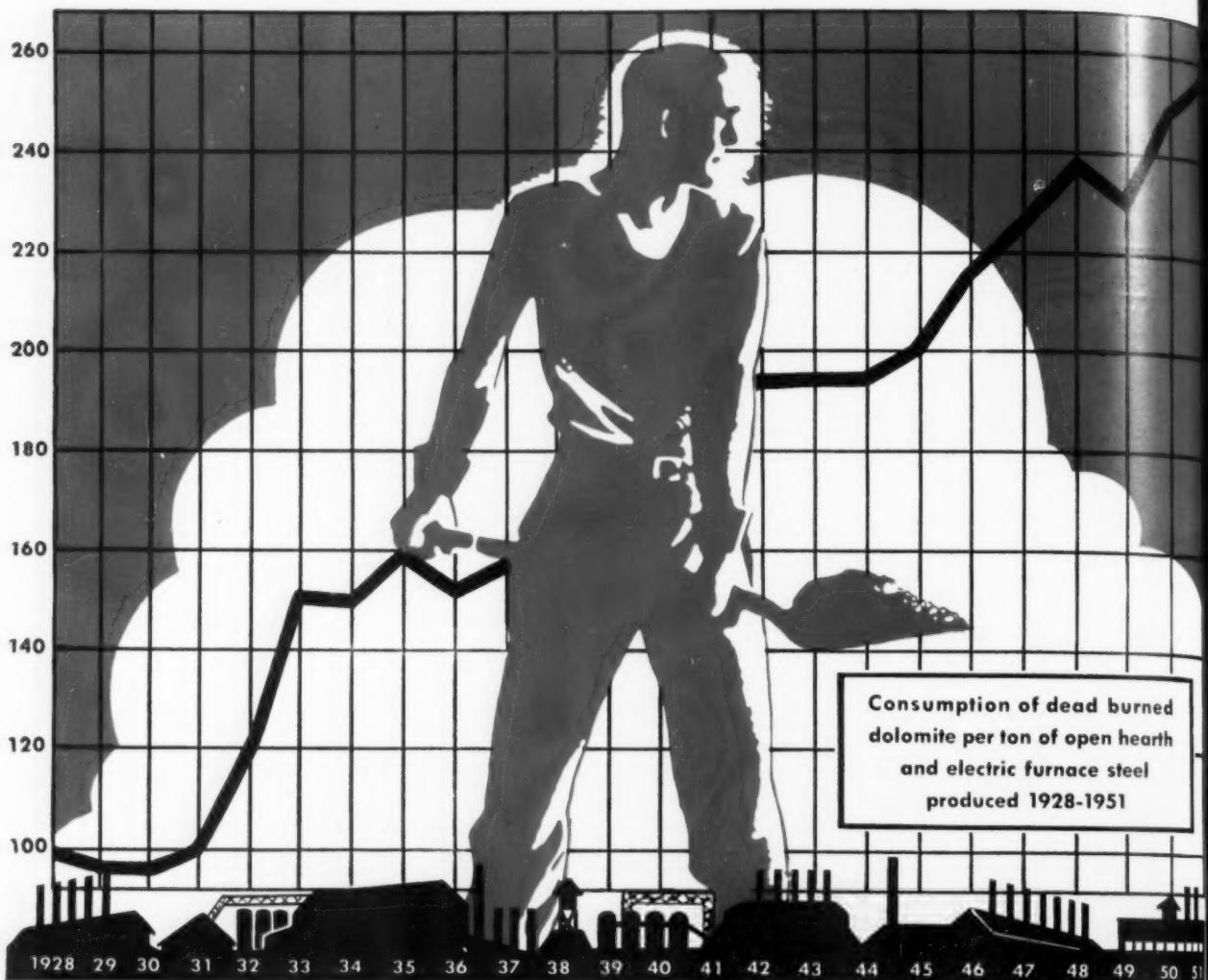
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Write for Bulletin 3295-B.

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THE use of dead burned dolomite by the steel industry has more than doubled in the past 24 years. Consumption per ton of steel is now a third higher than during the war. This steadily rising trend is due to three factors:

1. It saves time. Operation of steel furnaces at near capacity rates demands a repair material that "sets fast and stays fast". Normal maintenance with dead burned dolomite takes no more time than is required to place the refractory.

2. It reduces bottom delays. The deteriorating quality of charge materials, fluxes and fuels contributes to increased severity of bank and bottom trouble. Proper use of dead burned dolomite makes it possible to offset the adverse effects of these factors and keep bottom delay down.

3. It lowers refractory costs. Despite the continuing trend toward the use of more dead burned dolomite, many shops report a reduction in total maintenance refractory expenditures, with consequently lower refractory cost per ton of steel made.

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THE IRON AGE

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Editorial

The Iron Age

FOUNDED 1853

Fear Recalled?

THE American people voted out fear last year. They—the majority parted company with fear of insecurity, fear of communism and fear that they were going soft.

This week many labor and management people are acting like a structural worker walking on a high girder after a serious illness. That first feeling of "What do I do?" is a little unsteady to some. Fortunately that timidity is not shared by President Eisenhower, his cabinet or strong hearts in both parties in Congress.

There has been a how-do-you-do about dropping wage and price controls. There never were any real wage controls. Attempts to control prices under such conditions produced nothing but confusion. The law of supply and demand took care of thousands of prices. Production and the consumer did, and are doing, what controls could not do.

Labor leaders are flexing their muscles. They demand higher wages and greater fringe benefits. Their loud talk—they hope—hides their disappointment at losing top billing at the White House. They are trying to take President Eisenhower's measure.

They will find it to be as he said it was—friendly but fair to all. They will be tested on their fitness for leadership. Either they become statesmen seeking progress for all labor on a sound basis or they destroy—by personal vanity—what they and their workers have gained.

Some businessmen are in a price dilemma. They feel prices are too low to give a fair return. They fear to raise them lest they be censured; lest they be accused of scuttling the Administration.

They may bring trouble on their heads if they raise prices just because they have the right—without regard to responsibility, markets, better machinery, competition and long term outlook.

Businessmen must stand on their own feet. They must rise or fall on their own decisions. To them too the White House will be friendly but fair—to all.

Leadership counts. We cannot recall the fears of the past if we are to realize the hopes of the future. Labor and management are in the people's spotlight—for some time to come.

Tom Campbell

Editor



FARREL® GEAR DRIVES fit your needs like a GLOVE

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You only have to list your drive requirements: power and speed . . . type and gauge of metal to be rolled . . . process (hot or cold) . . . nature of load (continuous or intermittent) . . . type of drive motor . . . etc. We will then do the rest, supplying you with a designed-for-the-job unit capable of withstanding the shocks, stresses and wear encountered in continuous, heavy-duty service.

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Dear Editor:

Letters from readers

Pretreating Drums

Sir:

We forwarded to our people in Paris, who manufacture steel drums, your article "Industry Gets Chemically Clean Steel Drums" in the Jan. 15 issue. They were very interested in this report and come back with a question about the pretreatment suggested in the beginning of your article.

It seems that vapor degreasing is practiced in France but is found to be an expensive procedure. Consequently, our people would be interested in learning more about the process of removing grease with mineral spirits.

Does the process consist of immersing the drum in a bath of mineral spirits; and what mineral spirits should be used? We wonder also, which of these two degreasing processes is more commonly used over here.

We would be grateful for any additional information you could give us in this respect.

W. S. GIERSZYNKI

W. S. Gierszynski
New York

There are very few vapor degreasing cleaning methods applied to large tonnage production in this country. It is done, however, for cleaning small machined parts, such as bearings.

The pretreatment mentioned in our article is really an alkali emulsion cleaner. This emulsion is made up of high flash naphtha and trisila. The mineral spirit is Ridsol 250; the alkali is Ridoine 46—both sold by American Chemical Paint Co.

In practice this emulsion cleaner is sprayed at 15 psi through jet nozzles at a temperature of about 165°F. The free alkali concentration of the solution is 2.0 pct.—Ed.

Economical

Sir:

Item No. 7 on the Newsfront page of your Jan. 22 issue refers to substantial savings in machine hours and increased tool life having been reported by users of fully-annealed gray iron castings.

Will you kindly send us the name and address of the producer to whom you refer.

A. P. BARNASKEY
Manager

Westcott Chuck Co.
Oneida, N. Y.

We refer to the Central Foundry Div. of General Motors Corp., Saginaw, Mich.—Ed.

Plastic Dies

Sir:

An item on p. 47 of your Jan. 29 issue stated that radio and TV parts makers are considering use of plastic dies for high production runs of stamped parts.

I would appreciate any additional information concerning this subject.

J. TOTH

Standard Control Div.
Westinghouse Electric Corp.
Beaver, Pa.

An article on plastic dies for short runs appears on p. 115 of this issue.—Ed.

16-16-1

Sir:

I read with interest your article "New Stainless: Passes Its Tests" in the Jan. 1 issue. I was particularly interested in the statement, "Corrosion data on 16-16-1 is meager to date. But it is known to be better than 430 and not quite as good as 18-8."

It would be greatly appreciated if you could send me some references or data supporting this statement.

L. H. WILSON

Asst. to Gen. Mgr. of Sales
Sharon Steel Corp.
Sharon, Pa.

An article on 16-16-1 will appear in our Mar. 12 issue. Included in this article will be some of the preliminary corrosion data.—Ed.

Clarification

Sir:

In your Jan. 22 issue there appeared an article on "Welded Jet Engine Parts Cut Weight, Increase Power." In the accompanying table I, group 2 (p. 111), we find that one of the alloy types is termed "Stellite 21 or Vitallium."

This last is a misuse of our registered trademark "Vitallium" and is, further, technically incorrect, so we feel certain you will want to know the following facts:

Vitallium is our registered trademark applied to dental cast and surgical appliances, and dental and surgical alloys made by Austenal. Vitallium alloy does not have the chemical composition ascribed to it in the article cited above.

C. A. CERAMI

Austenal Laboratories, Inc.
New York

You are right; the jet engine alloy which is inadvertently called "Vitallium" by the trade does not match the chemical composition of your dental alloy but is a modification of it.—Ed.

COLD HEADED—
ROLL THREADED

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SPECIAL
FASTENERS
and SMALL PARTS
are BETTER



**BECAUSE
YOU
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A greater variety of fasteners and small parts that can be made faster, stronger and more economically by Pheoll's cold heading and roll threading methods. Cold working of wire stock often surpasses turning, casting, stamping, drawing or molding.

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Cold-heading results in much less scrap than in metal cutting operations, in fact in the production of most cold-headed parts there is little or no scrap.

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CROSS
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Special MACHINE TOOLS

Fatigue Cracks

by William M. Coffey

Service W/Smile

What makes one magazine the leader? What, for instance, makes 81 pct of the people who take THE IRON AGE renew their subscriptions year after year (the highest percentage we know of in this business except, perhaps, the Sing Sing Alumni Review at 81.1 pct which, of course, is an association paper anyway).

What makes them come back every year and pay good cash for more of the same cookies? One reason? Superb editorial content, naturally. But we like to think, too, that our Reader Service Dept., which operates above and beyond the call of duty, is a good reason why we can make pals out of our family of readers.

This is a splendid department headed up by you-bet-your-life, of course, and Miss Kathy O'Donovan, executive officer. We toil to keep everyone happy with answers to all kinds of questions from how to heat treat buttered rum to double-reefing a mainsail. Here's an example of this extraordinary service. The following letter was received from one John C. Eagerton, Sr., owner of the Eagerwild Plantation, Montgomery, Ala., who produces "snow white eggs with lemon centers":

Dear Sir:
IRON AGE or Successor. Kindly let me know where I can purchase the inner wheel that turns to feed seed out of the Iron Age planter and cultivator that was purchased in Columbia, S. C. in 1913. It is in good condition except this wheel with the brushes on it.

Cordially yours,
John C. Eagerton, Sr.

Your Reader Service Department, seeking an expert, turned this over to Jug Brown, our Technical Editor, who, true to his faith, answered thusly:

Dear Mr. Eagerton:
We have received your letter of January 14th. THE IRON AGE is the National Metalworking Weekly in its 98th year of publication. We have never made any farm equipment. The only thing we make is a magazine. Suggest you contact the large manufacturers of farm equipment. Good luck!

Darwyn I. Brown

Many shall run to and fro, and knowledge shall be increased. *Ibid. XII, 4.*

Kennel Fashions

The Pilgrim fathers used oyster shells as a source of limestone for the "flux" in New England's earliest blast furnace. Yes, sir.

Please accept our sincere thanks

—in advance—for the lovely cards, flowers and gifts sent us while a patient in the Stamford Hospital for submitting a thing like this:

When the flood was over and Noah had freed all the animals he returned to the Ark to make sure that all had left. He found two snakes in the corner, crying. They told him their sorrow: "You told us to go forth and multiply upon the earth. How can we multiply upon the earth? We're adders."

* * *

The first U. S. building specially built for astronomical observation was constructed near Philadelphia in 1769. Mais oui, señor.

Puzzlers

The beef problem has brought forth a lot of prospective butchers. The correct answer is 4800 lb of beef. And here are the winners: E. L. Faneuf, Mrs. Helen Swindler, George Sidaway, Albert Alles, W. Forley 3rd (correct too, for ship and boiler, "nearby town" and coin puzzle), E. A. Schwab (also correct on ship and boiler puzzle), Bert Brown, S. Stewart Anthony, T. B. Hudson, Jr., F. Rondepierre, W. E. McCord, J. W. Algeo, D. S. Tarr and Mary Lou Perrott.

Likewise we've rounded up quite a few prospective theatre managers. The answer to the theatre puzzle is 70 children, 19 ladies and 11 men. The winners: Henry Cohen, Marie O'Connor, Dorothea Vollono, W. Forley 3rd again, W. E. McCord again, Galen Pfleiderer, Mary Lou Perrott again, H. G. Taylor, Mrs. Helen Hovey, C. J. Johnson, Jr., Paul A. Eckhardt (also winner of the ship and boiler and beef puzzles), old friend L. D. Rice, old friend D. S. Tarr again, old friend E. A. Schwab again, and Albert Alles again, E. T. Imbach, Joe Voldrich and Eva and Ernest Grunebaum.

New Puzzle

This week's puzzle has to do with an apple tree on which are growing 294 fine, green apples. These apples will soon be ready for picking and are worth on an average one-twelfth of a cent each. And each apple, so long as it remains on the tree, increases in value one-twelfth of a cent daily.

But six apples drop off the tree each day and are therefore valueless. This leaves the question of how many days after the first counting should the apples be picked in order to secure the greatest possible value? Another good one from Mr. Rice.



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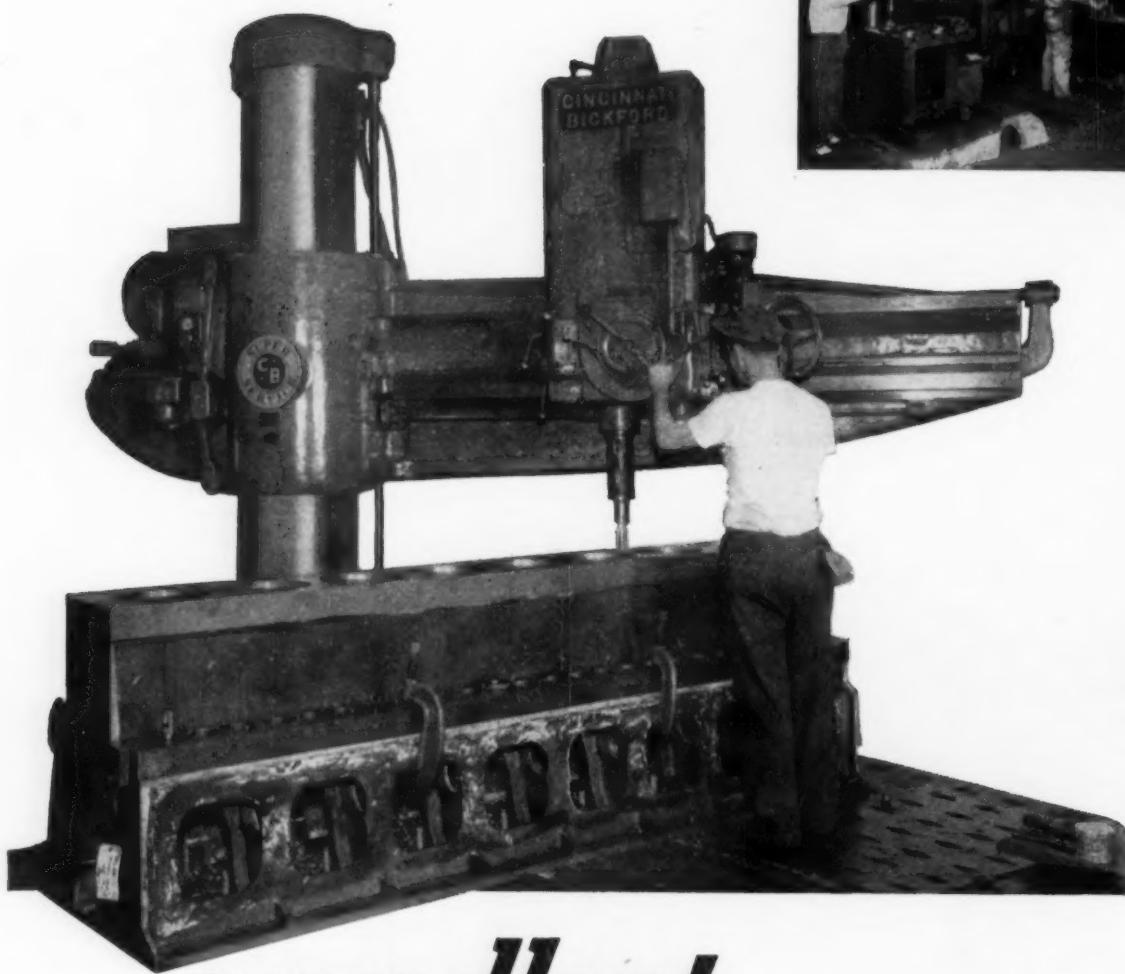
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This battery of Cincinnati Bickford Super Service Radial Drills is drilling, tapping and reaming smaller parts.

"excellent in all respects..."

The ease of handling, the performance, accuracy and speed of the 7' arm, 19" diameter column Cincinnati Bickford Super Service Radial Drills "rated excellent in all respects."

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Write for descriptive circular of these fine machines.

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THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

THE IRON AGE Newsfront

MACHINE DESIGNERS LOOKING AHEAD to the automatic factory of the future claim there will be no room for conveyors in the streamlined plants. They believe machines can be so closely linked that conveyors would waste space and cause time loss.

ONE OF THE FIVE STEEL COMPANIES SUPPLYING the chrome-manganese stainless on the type 301 price basis recently raised its price 3¢ per lb. The new chrome-manganese stainless costs more for two reasons: (1) Lower mill yield in rolling; (2) the difference between scrap recovery and price of original manganese and nickel.

DEVELOPMENT OF CERAMIC COATINGS FOR AUTOMOTIVE BRIGHTWORK is the subject of much intensive automotive research. If a satisfactory coating can be found it will be used on functional parts to solve the problem created by the continuing nickel shortage.

SOME MAKERS OF CONSUMER DURABLES SEE STIFF COMPETITION after the second quarter of '53. Price cuts may materialize in electric ranges and refrigerators. Current prices are in line with 1952.

TRANSFER MACHINES FOR AUTOMATIC ASSEMBLY are getting more attention. Most promising cost-cutting development is a new type machine that automatically feeds and assembles small parts into vital auto sub-assemblies. Most designs pay for themselves in a year, some in a few months.

HIGH-TEMPERATURE SYNTHETIC LUBRICATING COMPOUNDS designed to make jet planes faster and safer are being studied at the Lewis Flight Propulsion Laboratory. Diethylhexyl and diethylhexyl-sebacate compounded with silicone molecules, tested on friction testing machines, will be tested next in turbo jet engine bearings.

ROUGH-AND-READY COMPETITION FROM OIL LINES is forcing drastic rail rate reductions—some as high as 40 pct—from Texas to the Pacific Coast. Effect of the move is to discourage, for the time being, big pipeline projects now on the drafting boards. Pipe tonnage, as a result, is now available for other uses.

EXPANSION OF THE INLAND WATERWAY FLEET may have been set back as much as 2 years by the steel strike. Example: Great Lakes iron ore shipping was to have been increased by 25 vessels by end of '53. Chances are no more than 18 of these may be launched by next January.

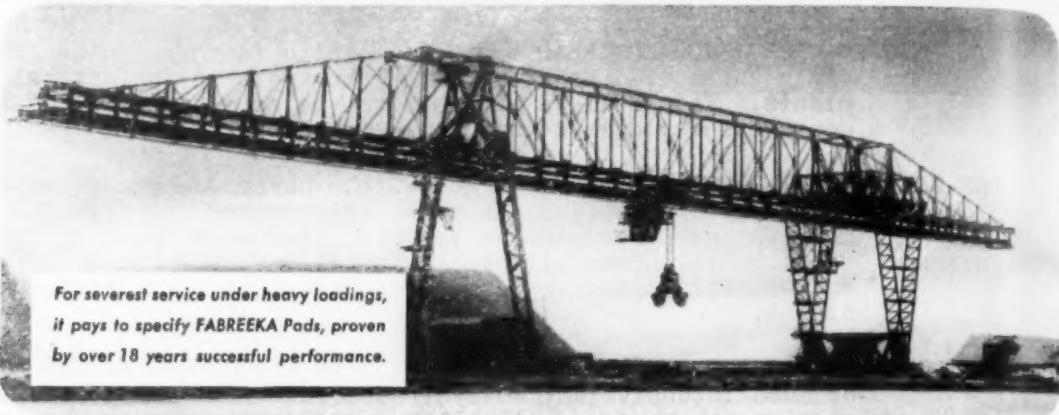
USED PLASTIC WORK GLOVES CAN BE RECONDITIONED by coating with a plastic material. The method, worked out by a Detroit firm, adds up to 100 pct more working life.

VIBRATION CHARACTERISTICS OF MAJOR AUTO COMPONENTS have been isolated, studied and measured. By unsynchronizing frequencies of masses which resonated with each other, engineers eliminated some car vibrations, reduced others to unobjectionable levels.

QUALITY IN SCRAP IRON AND STEEL SHIPMENTS is being sharply underscored by steel mills. Stockpiles in mill yards remain large. A sign of market weakness is the price slide of blast furnace grades in a few areas. Trade feeling is that prices of good quality grades may stay put, some weak grades may slip.

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PRICES: Decontrol Doesn't Signal Inflation

Purchasing agents quizzed in Iron Age survey don't believe end of price controls spells inflation . . . Expect stable trend in pricing . . . Some prices up, some down—Staff Report.

Purchasing agents of metalworking firms are not much perturbed by the end of price controls. They do not believe this will be the signal for an outbreak of inflation. The slight degree of inflation the PA's mentioned would be in the nature of price adjustments. Nor do they believe decontrol would set off a sudden burst of industrial buying.

While Office of Price Stabilization was sloughing off price controls by the hundreds last week IRON AGE editors in a dozen major industrial districts were interviewing over 100 buyers.

See Overall Stability

Distillate of their opinion was that the price level would remain relatively stable.

Some industries would be forced to make minor upward price adjustments to compensate for a painful profit squeeze but for the most part the price trend was seen as level. In months ahead they expected there would be a pull and tug within the metalworking price range as some prices slip, others rise.

Both regarded as moderate, the dips would be born of competition, more abundant supplies of raw materials, and the rises would be caused by too painful a pressure on profits by higher costs. Feared by many as a possible price-booster were increasing wages.

Purchasing agents showed such a respect for the force of unrestricted competition that a few were

willing to predict that the price trend much later this year could be down. But for the nearer months the PA's were generally forecasting a stable price trend, punctuated by increases and decreases.

These Go Up

Leading the list of items which the buyers thought most likely to go up were some steel items, copper, and products fabricated from those metals. Less frequently mentioned but still on the increase list were special castings, heavy forgings, top grades of steelmaking scrap, some special tools, and specialty metal products containing nickel and other scarce alloying materials.

On the weak side, according to the PA's interviewed, were soft

Free Basic Metals

Immediate open-ending of Controlled Materials Plan means that producers of steel, copper, and aluminum can sell to anyone — after they've honored tickets already issued. And manufacturers can use all steel they "find". For Washington action see p. 64. For industry reaction see p. 143.

goods, some maintenance supplies, some chemicals (below ceiling in several instances) fuels, some appliances, fasteners, and some not-so-scarce grades of steel and scrap iron.

Purchasing agents saw some areas of rising costs. One of these was the seventh wage round which had not reached a head because of Wage Stabilization Committee stalling. The effect of these postponed wage demands may be felt fully in the next few months.

Another was the "relief" price rise. PA's explained this as being an increase necessary to restore profit margins to sound levels. Many industries succeeded in wresting from OPS some price increases but these were considered inadequate. Higher costs can be absorbed to a certain extent. But beyond this point the firm must raise prices even in the face of keen competition.

Wage and other cost increases were most frequently named by PA's as reasons for anticipated steel price rises (THE IRON AGE, Feb. 12, 1953, p. 71). However, while the buyers pretty much agree on selective price increases they

AS PRICE CONTROLS END . . . PURCHASING AGENTS EXPECT

► There will be no drastic price changes—up or down . . . but a negligible dose of inflation's possible.

BUT . . .

There will be plenty of adjustments and realignments. So buying policy won't change much in the near future.

► Increases are likely in copper products, steel, and special metal and alloy products.

► Already ample raw materials will become even more abundant . . .

BUT . . .

There may be a temporary order book scramble in steel.

► After supply-demand shakedown, competition may eventually force prices down—in the future.

► Wage pressure will remain the most inflationary factor.

AND . . .

Competition and lowered taxes offer the best chances for price reductions.

Special Report

Continued

eye the future possibility of expanding steel capacity up-ending the present supply-demand imbalance.

Thus, there were "down" factors and "up" factors listed by the PA's. Foremost of the "down" factors was competition. This was followed by an improving supply of raw materials and metals. Then came an area of savings possible now and later. First expensive paperwork necessary to maintain controls liaison with the government would be abolished.

Then there was hope that the tax load on manufacturers would ease with the lifting of the excess profits tax—sometime in the future months. And finally there was the possibility that a transition to regular price steel from present high price conversion arrangements would effect substantial savings for heavy mass production industries such as appliances and automobiles.

General in the area reports of purchasing agents was the strong inclination to keep purchasing at a steady keel for the coming weeks. For many, procurement has been substantial in recent months because of a revived business volume. For others, procurement would be stepped up in the metals field if those metals were more abundant.

Automotive Outlook

IRON AGE'S Detroit report highlighted the fact that buyers do not expect any inflationary surge to develop. Interviewed was a cross-section of plants making autos, auto parts, metal products (ferrous and nonferrous), stampers, and platers.

Here the expectancy prevailed that some steel prices would rise. Candidates were hot-rolled bars, sheet, and some strip. Copper was also ripe for a price upswing.

Most purchasers of stampings, miscellaneous parts and small items felt that a slight increase was firming up. Prices of these products, while generally below ceiling in the face of strong com-

petition, will rise if costs go up anywhere. Profit margins are too slim for cost absorption.

The purchasing tempo of Detroit, hot on the trail of a freshened but competitive auto market, is gaisted to the availability of materials. If more steel and copper were available the PA's would pick it up eagerly.

In the Pittsburgh district, consensus of PA's was that death of controls would bring no sudden or sharp increase in the prices of the commodities they buy.

The buyer for an appliance maker expected prices of the equipment he bought to remain unchanged. He said flatly that he anticipated no increases in machine tool prices and that competition would keep them level.

Downtrend on Some

On prices of his company's product the appliance PA believed they would stay firm for the rest of the year. Some exceptions to this may be electric ranges and refrigerators—and the trend here may be somewhat down because of heavier competition.

A Pittsburgh steel producer did not believe the prices of products it buys would change much. As is the case in other steelmaking areas, top grades of steelmaking scrap may rise a little but prices of other grades might fall. Buy-

ing tempo for this company was to remain steady.

A maker of plate glass felt that prices would hold or even decline slightly. Purchases, now continuing at a high level, would remain the same.

Purchasing agents for an aluminum company looked for little change in prices. Increases would be restrained by competition. Buying here was slated to remain on the same level.

In Philadelphia, purchasing agents agreed that price controls did not spell inflation. Prices would neither slide nor rise violently and the status quo would generally prevail for a while. The PA's left room in their predictions for any sharp wage increases.

St. Louis fitted in smoothly with the general run of price forecasts. Industrial buyers in that district felt that prices would remain generally unchanged but there was room for a few minor decreases. Some appliance manufacturers reported their products were now selling under OPS ceilings.

Most purchasing agents in the Chicago area believe prices of the materials they buy will stay the same. But almost as many anticipate a slight increase.

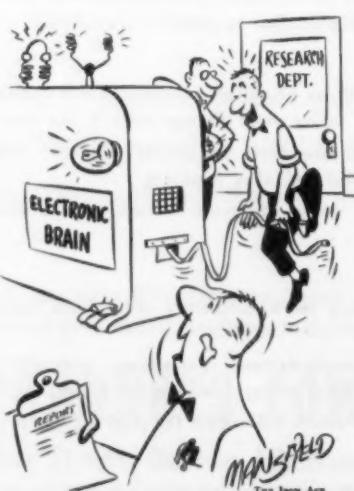
Labor Costs Count

In the appliance field, one purchasing agent said there will be no immediate reaction to decontrol. When there is a change, it will be in fields where labor is the most important item. Purchases by his company will remain the same, while the prices on its end products may fall in the second quarter, depending on demand.

Cleveland purchasing men are almost unanimous in predicting that decontrol will not bring any drastic price changes. Buying schedules remain virtually unchanged.

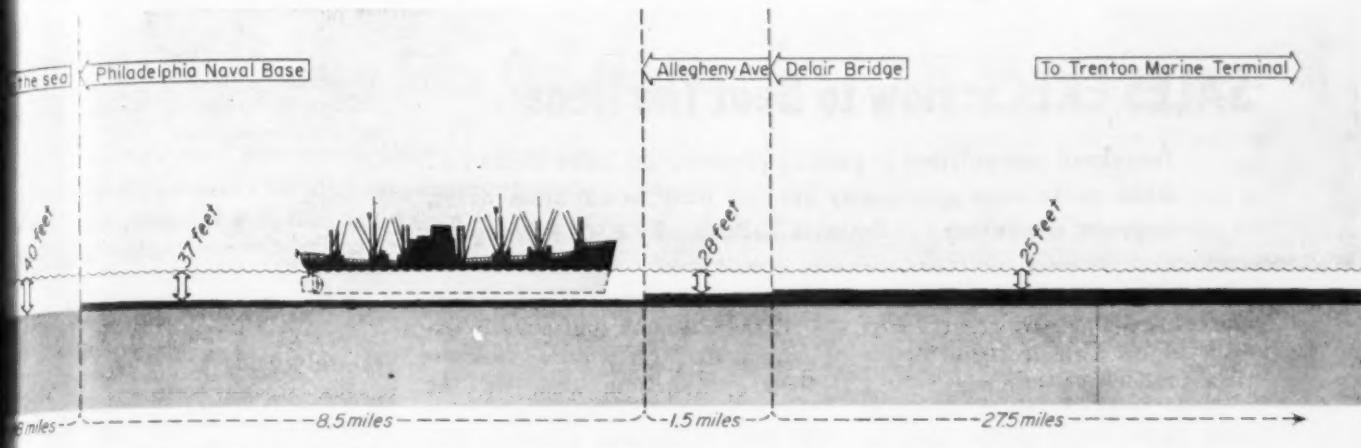
Birmingham purchasing agents believe that the large majority of prices will not go up after decontrol.

On the West Coast purchasing agent sentiments did not conflict with those elsewhere.



"It says we should hold off buying. Prices may go down if they don't go up."

Transportation



RECOMMENDED 40-ft channel (black) would permit big vessels to serve Fairless Works.

DELAWARE: Deeper Channel Urged

Area engineers recommend 40-ft channel for Delaware river . . . Congress must decide . . . Deeper channel would spur already booming industrial expansion in area—By W. V. Packard.

Industrial expansion along the Delaware River, already progressing at a terrific clip, may be further spurred by news that dredging of a proposed 40-ft navigation channel is a step nearer.

U. S. Army area engineers, after lengthy public hearings, during which they heard volumes of evidence and arguments, pro and con, have finally submitted their report to the Corps of Engineers in Washington. Their report is favorable to industry.

Up to Fairless Works

They recommend dredging of a 40-ft channel in 31 miles of the Delaware from Philadelphia Naval Base north to Newbold Island opposite U. S. Steel's Fairless Works at Morrisville, Pa. Also recommended is a 35-ft channel from Newbold Island to the Trenton Marine Terminal. The channel from Philadelphia to the sea is already 40 ft deep or more.

Cost of the project is estimated at \$87 million.

The engineers' report was also submitted to the governors of Pennsylvania, New Jersey, and Delaware for comments within 90 days.

Corps of Engineers in Washington admits it has received the report and has invited comment

from interested government agencies (such as Dept. of Interior). After comments are received and evaluated, Corps of Engineers will decide what its own position will be. (It is expected to endorse the area report.)

Congress Must Decide

If the report is approved it will then be forwarded to Bureau of the Budget for a decision on whether or not to ask Congress for appropriations.

Copies of the area engineers' report may not be generally available for several weeks, but file copies are on hand at division engineers' offices in Philadelphia, Washington and New York.

Although the channel deepening project still has a long bureaucratic and legislative path to travel before actual dredging can begin, the area engineers' report was a vital step. An unfavorable report would have killed the project in its tracks. Delaware port authorities are already hailing the favorable report as a boon to industry in the area.

"Gold Coast" Booming

In addition to U. S. Steel's Fairless Works, more than 8000 other industrial plants along the 135-mile Delaware "Gold Coast" from

Trenton to the sea, stand to benefit from a deeper channel.

The concentrated industrial area is already in the midst of the greatest expansion in its history. Altogether, some 300 firms are building or expanding in the river valley. Total area expansion cost has been estimated at close to \$4 billion: Well over \$2 billion of this is being spent directly on new or expanded plants and facilities.

A full account of industrial expansion in the Delaware River Valley appeared in *The Iron Age*, Dec. 18, 1952, p. 75—Ed.

Taken together, the ports of the Delaware form the second greatest harbor in the country. During 1950, they handled a combined total of 68 million tons of cargo; in 1951 their volume was placed at 75 million tons; 1952 was still greater.

Depths Now Okayed

Presently authorized Delaware channel depths are as follows: From Delaware Bay to Philadelphia Naval Base (98 miles), 40 ft; from the Naval Base to Allegheny Ave. (8.5 miles), 37 ft; from Allegheny Ave. to Delair railroad bridge (1.5 miles), 28 ft, and from Delair bridge to Trenton Marine Terminal (27.5 miles), 25 ft.

Actually in many places the midchannel depths are today less than now authorized by Congress. For some 25 miles below the city of Trenton, the channel depth in several places has shoaled to as little as 17 ft.

SALES EXECS: How to Beat The Heat

Increased competition is putting pressure on sales staffs . . . AMA conference points way out . . . How to cut sales costs, improve marketing . . . Business outlook—By E. C. Kellogg.

Sales staffs are on the spot. The market is competitive and the cost of making a sale is rising faster than product prices.

Under these pressures, salesmen must figure every angle. And to get the latest angles, 1000 sales executives crowded into New York's Hotel Statler last week for American Management Assn.'s 3-day marketing conference.

Key executives told those at the

national product to about 12 pct.

If the economy continues to expand at its present rate, gross national product in 1955 will be worth \$365 billion, 8 pct more than in 1951. Consumer durables will enjoy the largest market increase—and should do about 15 pct more business in 1955 than in 1951.

Washing machines, electric ranges and aluminum will continue to grow, though subject to

Marketing Conference Quotes

"... for this year, most of the indicators point toward the strong probability . . . of another good year."—M. Joseph Meehan, director, Office of Business Economics, Dept. of Commerce.

"... the general sales meeting, at least in its present form, is over decisively, and finally . . ."—William McAdams, president, William Douglas McAdams, Inc.

"... No matter how clearly written company literature may be, without (sales supervisor) cooperation we can never be sure it amounts to any more than stuffing for a wastebasket."—Willis Morgan, sales manager, Burroughs Adding Machine Co.

conference that business prospects are good; they pinpointed trends in sales management, told them what to do about increased sales costs, and outlined ways to improve marketing techniques. Following are highlights of what some of the speakers said:

1. Business Outlook . . . 1953 should be another good year. A downturn in 1954 is a "real possibility" but the pressures that would force a slump are not exceptionally strong. In 1955 the economy will be given its most serious test.

Contrary to what some businessmen believe, level of defense spending will not be the dominant factor in the market during the next few years. Defense spending will average about \$40 billion per year and will drop gradually from a peak value of 15 to 17 pct of the

cycles. Farm and home freezers and air conditioners are expected to be strong.

Market increases are also anticipated for television sets, clothes dryers, industrial electric trucks and tractors.—*M. Joseph Meehan, director, Office of Business Economics, Dept. of Commerce.*

2. Sales Management Trends . . . Era of the much-kidded general sales meeting is at an end. It is being replaced by smaller group meetings resembling clinics.

Sales management is being desentimentalized. No longer regarded as a mystic art, it is becoming a professional operation.

In many leading firms, administrative details are being shifted from the sales manager to other executives so that the sales head will have more time to manage

the men under him.—*William McAdams, president of William Douglas McAdams, Inc.*

3. Sales Costs . . . In determining sales budgets, most firms use a cart-before-horse approach. They start with a sales forecast and allot a fixed percentage of these sales as selling overhead. What's left is the sales budget.

For greater accuracy, the sales manager should first prepare marketing plans for each product or product group. He should then determine the cost of carrying out the program and forecast the sales that might result.

With these figures available, the sales manager can determine his departmental earnings and compete with other departments for the money his company plans to spend.—*Arthur Tunstall, Jr., Pennsylvania Salt Mfg. Co.*

4. Marketing . . . Streamlining of product lines is one of the best ways a manufacturer can insure survival in a highly competitive market. The process may mean dropping lines or adding new ones.

To determine whether a product should be added or junked, management should check the following: (1) Is the product being kept on because of inertia, personal or political reasons? (2) How large is the market and what percentage of it can be expected to buy?

(3) If the product is not as good as competitive items, why isn't it? (4) What is the trade reaction to the product? (5) Can it be produced on a profitable basis? (6) Would it be better to spend equal time and money on another related product?—*Robert Dick, vice-president, Illinois Tool Works.*

Small Orders . . . The problem of handling unprofitable small orders can be eased by giving as many of them as possible to distributors. The distributor is geared to handle small orders because he can combine orders from different sources.—*Harold Torell, vice-president, Syracuse Supply Co.*

TESTS: Psychology Sifts Out Misfits

Armco uses placement tests to streamline selection of new employees . . . Determines job assignments . . . Sometimes hidden talents are discovered . . . Saves money—By J. B. Delaney.

The handsome young man with the easy smile and pleasant personality made a good impression.

Armco Steel Corp. was in a mood to put him on the payroll. After all, this lad obviously had the makings of a top-flight sales engineer.

Even Armco Psychologist George Hill was impressed. He almost hesitated to give the usual pre-employment tests.

Then the roof caved in. Test scores were unbelievably poor. Confronted with this, the young man broke down. Yes, he had attended college but had squeaked through on athletic ability and the help of others before flunking out in his senior year. He didn't get the job—and Armco saved time, money, and embarrassment.

Then there was the Army "colonel" with an engineering school "education" who turned out to have been a buck private with no college training. Pre-employment tests had raised the red flag that prompted a check of the Army and the school the applicant named.

Lifting Iron Curtain

George Hill has seen this sort of thing happen many times in the 5 years he has been with Armco. The reverse is true also. His files contain scores of instances where tests have uncovered many lights hidden under bushels in Armco plants — laborers, for example, found to have exceptional abilities the company could use in better, higher-paying jobs.

The tests have also confirmed that education is not necessarily the same as intelligence. Production workers occasionally score better than research people and others in the so-called "white collar" group.

These are only some of the reasons why Armco people are sold on industrial psychology — a fancy term for a technique that lifts the

"iron curtain" that humans often hide behind, to reveal abilities and shortcomings they themselves didn't know existed.

The company emphasizes that psychology supplements but does

managers, that it has increased job satisfaction and attracted a better type of worker to the company. It has minimized the percentage of square pegs in round holes. The company believes it has helped reduce accidents by weeding out accident-prone workers.

Three years ago, Armco estimated that 5 pct of its new employees had personality faults that classed them as undesirable or borderline cases. Today scarcely 1 pct of new hires could be put in

INDUSTRIAL PSYCHOLOGY



not replace the usual checks of would-be employees on such factors as previous employment, education, background, and health.

Armco has been using placement tests since before the war when Dr. Guy E. Buckingham, head of the Department of Psychology, Allegheny College, Meadville, Pa., was retained on a consulting basis. Mr. Hill, 32, who studied under Dr. Buckingham at Allegheny, has been with Armco full time since June 1947, is now staff supervisor of employment.

Many Benefits Cited

Basically, Armco has been using psychology to (1) screen out the misfits, (2) assign people to work for which they are best suited, (3) promote on the basis of ability, (4) select employees for further training, and (5) keep a running inventory of performance by supervisors, managers, and hourly-paid employees.

Has the program paid off? Armco says yes. It believes it has resulted in better workers and better

this category. Another difference is that Armco can identify this 1 pct and take precautions, something it could do only partially 3 years ago, before the program hit full stride.

What They Test

A study of 13 major accidents at a company division 4 years ago showed that 10 of the 13 men involved were below standard in one or more of three important considerations—mental ability, mechanical comprehension, and personality—shortcomings that Armco's tests are designed to determine. Apart from pain and disablement of workers and disruption of production, the accidents cost Armco dearly in dollars and cents.

Typical Armco tests aim at measuring a man's ability to think, the speed and accuracy of his thinking, his mental ability, his understanding of everyday mechanical situations, his emotional stability, self-sufficiency, self-confidence, sociability, and other personality traits. Tests are varied for clerical

Marketing

workers, salesmen, technicians, supervisors, and candidates for apprenticeship programs.

Like other Armco supervisors, Mr. Hill feels that psychology in industry is more important today than it has ever been, is likely to grow in importance as industry generally and steel mills in particular become more complex mechanically and electrically. He subscribes to the Armco philosophy that "no one has a monopoly on brains—it's how you use them that makes the difference."

Pick Trainees

The tests have been especially helpful in deciding which employees should be given further training for better jobs. These training programs are expensive, usually involve taking trainees off the job 1 day a week to attend classes — at regular pay during working hours.

It's a waste of time and money, Armco believes, to try to train men who are not trainable. Tests help avert costly mistakes like this. The first man to drop out of an Armco apprentice program recently was the man who scored lowest.

"Personnel Auditing"

One of the more important phases of the testing program is what Mr. Hill calls "personnel auditing." Once a year supervisors and some hourly-paid employees are "audited" by their superiors through a questionnaire that paints an up-to-date picture of the employees' ability, personality, leadership qualities, judgment, initiative, dependability, etc. This "inventory" helps determine who rates promotion or assignment to a more important job. To date more than 20,000 employees have been so "audited."

Mr. Hill is now winding up a 16-week program with management people on "human relations." Sessions are held 1 night per week, are well-attended, usually break up after scheduled time. Classes are participation rather than lecture type; a situation is tossed into the pot and everybody has a crack at solving it. The program is showing results.

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INDUSTRIAL WIRE SPECIALISTS

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VISION: Bad Eyes Cost You Money

Don't overlook production value of employee sight, experts warn... Eye testing programs save money, cut accidents, rejections... Safety goggles not enough—By G. G. Carr.

Most firms these days make goggles available to workers when needed. And everybody agrees plants should be well lighted.

But industry often underestimates its stake in employee eyesight, warns the National Society for the Prevention of Blindness.

Lack of adequate eye protection programs can be expensive, inviting accidents, law suits, high insurance rates. Juries are tending to blame eye trouble on working conditions. Companies not able to prove the condition existed before hiring can be in trouble.

Loses One Good Eye

One employer was shocked to learn a worker had lost an eye in a shop accident. He was even more upset to find the worker had only one good eye to start with. Plant records didn't show it. The jury hit the company with heavy damages for total blindness.

In this case a simple test would have dug up the trouble before employment. And under the laws of that state the boss could have held out for a compensation waiver from the worker. But it's not always that obvious.

Shell Pipe Line Corp. found a few years back it was spending an average of \$4.37 per year for eye care for each of its 1200 employees. That was in addition to \$987 for safety goggles during the same year.

Goggles Not Enough

Employees, particularly those with prescription glasses, weren't wearing the goggles. And goggles aggravated the discomfort of those who needed glasses and didn't know it.

An eye testing program was set up, with the company agreeing to furnish prescription safety glasses wherever needed. A vision screening device showed 28 pct of em-

ployees had significant vision difficulties. Of the total screened, 18.4 pct were referred to specialists for complete examination. The remainder had defects such as poor depth perception or lack of color discrimination.

Among other things, the test

kind. Some firms do insist on an eye check as part of the pre-employment physical, but it's often nothing more than a rundown of the familiar Snellen wall chart.

But these methods don't allow for the complexity of visual skills demanded by modern industry. Farsighted workers who misread nearby dials and meters can cause serious trouble. Color-blind workers who can't distinguish warning signals are a safety hazard. So is a craneman with poor depth perception. And any eyestrain cuts efficiency, boosts work spoilage.

What Vision Programs Need



turned up three workers with sight in only one eye. Company records listed all three as having sight in both eyes.

Over half of the workers referred for further examination already were wearing glasses. This is understandable, experts say, since vision begins to decline early in middle age. Bifocals are usually prescribed in the early forties.

Checking the program's expense, Shell found that eye cost dropped 48 pct in the first year. By the end of the third year it was 81.7 pct lower—from \$4262 to \$958.

Most companies leave it up to the worker to determine if he needs glasses. If he wears them it's assumed they're the right

Study of one plant showed that only 22 pct of workers with good vision caused more than 5 pct scrap, while 57 pct of those with subnormal, uncorrected eyesight went over the 5 pct mark.

All employees without accident histories passed the vision test. Sixty pct of the frequent but minor accident group passed, while only 40 pct of the serious injury group passed.

Important fact for employer and employee alike, experts warn, is that glasses for street wear may not be proper for work. Electricians or draftsmen, working at blueprints on a table at arm's length, shouldn't use glasses fitted for 14-in. reading distance, especially if they are over 40.

METALS: You Can Keep What You Find

CMP open-ended for steel, copper, aluminum . . . Excess mill space may be booked without tickets . . . But tickets must be honored . . . Output curbs scrapped—By A. K. Rannells.

First major action of the realigned materials controls setup was taken last Friday when Office of Defense Mobilization ordered an immediate open-ending of CMP. All allocations of steel, copper, aluminum under CMP will be discontinued entirely on June 30.

This means that producers of steel, copper, and aluminum may now—after honoring CMP tickets—book any excess mill space for any customer without tickets or further consultation with the government.

Output Quotas Scrapped

It also means that production ceilings and unit quotas, such as have been applied to truck and passenger car production, have also been scrapped. Effective date is Mar. 31.

This decision was reached after acting Mobilization Chief Arthur S. Flemming and his chief consultant, Harold S. Vance, Studebaker president, had carried the

proposal to the White House and there received the green light.

Controlled materials allotments already issued by National Production Authority for the second quarter still stand and must be honored by the mills.

This is to make sure of an "orderly withdrawal" of controls in line with White House policy, ODM said.

The directive system which establishes production tonnages by agreement between the mills and NPA will also be continued at least until July 1.

Meanwhile, Mobilizer Flemming has ordered a study to determine the best method of guaranteeing, after July 1, that defense needs would be met. This is now expected to end up as a simple priority system.

What Will Happen

Opinion differed in Washington as to whether decision to open-end CMP would have much effect dur-

ing the second quarter. Officials at NPA believed that mill books were pretty well filled for the period.

It was understood, however, that NPA has been holding something like 500,000 tons of foreseeable steel production in reserve for probable supplemental allotments.

Some guessed that NPA has underestimated second quarter steel production by as much as 1 million tons. Any and all of this tonnage, of course, would go on the open market on a first come, first served basis.

Expect Some Scrambling

Decontrol action was expected to touch off a scramble as consumers try to get on books of nearby mill suppliers, and customer relationships were certain to be reshuffled. Manufacturers like several sources of supply and were expected to act quickly.

This open-ending of CMP is somewhat in line with suggestions of the steel industry submitted last fall. But the industry recommended that the program be put into effect with first quarter 1953.

It is the first time in 2 years that any quantities of the three basic metals have been permitted to go on the open market without restrictions of some kind.

More to Do

Friday's action climaxed a hectic week of decontrol, beginning with outright wage decontrol and price decontrol of thousands of end items and commodities. But there was no word concerning the termination of price ceilings on steel and heavy equipment.

Meanwhile, a situation was building up on Capitol Hill regarding policy after June 30. President Eisenhower has made it fairly clear that standby control authority is not wanted.

But legislation to this effect has been introduced. Surprisingly enough it has considerable backing. Public hearings will start the last week in February.

STEEL: January Output Climbs

As Reported to the American Iron and Steel Institute

	Openhearth		Bessemer		Electric		Total		Calculated ¹ Net Tons in Weekly Month	No. 4.43
	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.		
1952										
January	8,103,123	100.7	407,298	89.3	625,696	89.7	9,136,117	99.3	2,062,329	4.43
February	7,703,066	102.4	382,712	89.8	571,432	87.6	8,657,210	100.7	2,081,114	4.14
March	8,401,140	104.4	376,861	83.1	624,190	89.5	9,404,191	102.2	2,122,842	4.43
1st Quarter	24,207,329	102.5	1,168,871	87.4	1,821,318	89.0	27,197,518	100.7	2,082,117	13.00
April	7,101,189	91.1	323,006	73.2	566,937	83.9	7,991,142	88.7	1,882,737	4.28
May	7,291,865	90.6	318,642	89.9	594,069	88.2	8,204,586	89.2	1,882,083	4.43
June	1,446,927	18.6	22,882	5.2	169,705	25.1	1,639,491	18.4	382,186	4.29
2nd Quarter	15,839,991	87.0	684,510	49.6	1,330,728	65.0	17,835,229	66.0	1,370,886	13.01
1st 6 months	40,047,320	84.8	1,833,381	68.5	3,152,046	77.0	45,032,747	83.4	1,731,363	26.01
July	1,347,587	16.8	2,000	0.4	277,371	38.8	1,626,958	17.7	368,090	4.42
August	7,599,888	94.4	308,361	57.8	589,438	84.5	8,496,687	92.4	1,918,440	4.43
September	8,039,128	103.4	351,620	78.8	671,357	99.6	9,062,105	101.9	2,117,314	4.28
3rd Quarter	16,966,603	71.2	662,981	48.1	1,538,166	74.4	19,187,750	70.4	1,461,367	13.13
8 months	57,033,923	80.2	2,496,382	42.5	4,690,212	76.1	64,220,497	79.0	1,840,789	39.14
October	8,747,640	108.7	347,042	76.1	712,148	102.1	9,806,530	106.8	2,213,731	4.43
November	8,396,227	107.7	336,902	76.3	705,757	104.5	9,438,866	105.9	2,200,207	4.29
December ²	8,666,930	108.0	343,371	75.5	677,861	97.4	9,890,162	106.8	2,192,344	4.42
4th Quarter ¹	25,812,797	108.1	1,027,315	76.0	2,095,768	101.3	28,935,878	106.0	2,202,122	13.14
2nd 8 months ¹	42,799,400	89.7	1,600,296	62.5	3,633,295	87.8	48,123,628	88.2	1,831,885	26.27
Total ¹	82,848,720	87.2	3,523,677	65.5	6,785,978	82.4	93,156,375	85.8	1,781,874	82.28
1953										
January ²	8,837,000	101.3	350,000	88.8	701,000	80.6	9,868,000	99.0	2,232,000	4.43

Note—Percentages of capacity operated in 1952 are calculated on weekly capacities of 1,816,837 net tons openhearth, 102,926 net tons bessemer and 157,777 net tons electric ingots and steel for castings, total 2,077,040 net tons; based on annual capacities as of Jan. 1, 1952 as follows: Openhearth 94,973,780 net tons, bessemer 5,381,000 net tons, electric 8,232,990 net tons, total 108,587,670 net tons. Percentages for 1953 are calculated on weekly capacity of 1,969,275 net tons openhearth, 88,934 net tons bessemer and 196,230 net tons electric ingots and steel for castings, total 2,254,459 net tons; based on annual capacities as of Jan. 1, 1953 as follows: Openhearth 102,877,900 net tons, bessemer 4,837,000 net tons, electric 10,232,490 net tons, total 117,547,470 net tons.

¹ Revised.

² Preliminary figures, subject to revision.

VENDORS: The Robots Invade Industry

Over 50 pct of machines sell their candy, gum, coffee, etc., inside factories . . . Start to take over in-plant feeding . . . Importance to metalworking, selling—By T. Metaxas.

In ancient Greece about 2000 years ago a man named Hero installed what was probably the world's first automatic vending machine to dispense holy water to worshippers at a pagan temple. He made himself the vending industry's first "operator" and the temple became the first "location."

Now, vending machines work on nickels and dimes instead of drachmas and the industry that makes and maintains the robot retailers is growing up in metalworking and marketing. In selling from a Hershey bar to a brassiere, vending machines are having a multi-pronged effect on many industries.

The "Break" is Pleasant

A horde of the mechanical salesmen now stand within industry's walls, making the employee "break" period more pleasant and partially dealing with nuisance in-plant feeding problems. As fringe benefits for workers, the first wedge of vending machines into manufacturing plants was driven by the old standbys of the industry—the machines that sell candy, nuts, beverages, gum, cigarettes.

Sandwich, soup, coffee, hot chocolate, pastry, cookies, tea, fruit machines are moving in. Over 50 pct of the nation's vendors, excluding cigarette machines, are planted in industrial locations and with industry expansion and loaded work rosters, more machines than ever are going into factories.

Affinity for People

They can be found lined up in offices, locker rooms, retail stores, subways, public toilets, apartment basements, transportation terminals, and on railroad cars. Everywhere that a substantial number of people move or work is the place for a vending machine.

Besides giving industry's work-

ers snacks and light lunches and making the plant a more congenial place, vending machine makers are important customers for steel and its products. Many vending machine makers order most of their parts from metalworkers and act

Vending Statistics

In 1951 2500 cup beverage machines were on the road, selling about \$3 million annually. Today the number is upwards of 39,000, dispensing about \$85 million worth of drinks. About 422,000 candy vendors sell at an annual rate of 4.4 million candy bars.

In 1947 about 1.4 million vendors of all types served the nation and the number rose to 2.2 million in 1949. The number is 2.9 million machines now and gross sales revenue is about \$1.3 billion.

Demand of industrial plants for coffee machines waxes strong. In 1950 only 4450 of these machines were on location and today the number has climbed to 16,300. Last year machines sold 720 million cups of coffee. The number of ice cream vending machines has doubled in 2 years.

as an assembly plant to turn out the finished machine.

Others are more firmly rooted in metalworking and make most of their parts themselves, contracting for other standard components.

Let's take a soft drink (three flavors) machine and see what makes it tickle. Spacarb, Inc., of Stamford, Conn., manufactures a vendor weighing 700 lb. From 655 to 665 lb of this weight are steel products and a goodly percentage is alloy steels for outside trim and machinery innards.

In the refrigeration unit are 20

lb of aluminum. The cabinet is fabricated of enameled sheet steel. A few plastic items can be found here and there, plus a copper pump, tubing, and fittings. To conform to health laws soda syrup tanks can be made only of nickel stainless steel.

In the machine are such other items as: Standard electrical parts, a maze of wiring, a refrigerating unit by a "name" producer, a great number of stampings and die castings, steel tubing, strip steel.

Hark to the Sweet Talk

From the sweet talk advertisements and promotional letters aimed at vending machine operators by suppliers of cigarettes, candy, gum, etc., it is clear that vending is potent retailing. In 1952 over 19 million units of candy, other products were sold through a national network of 2.9 million machines—and the gross sales revenue was about \$1.3 billion.

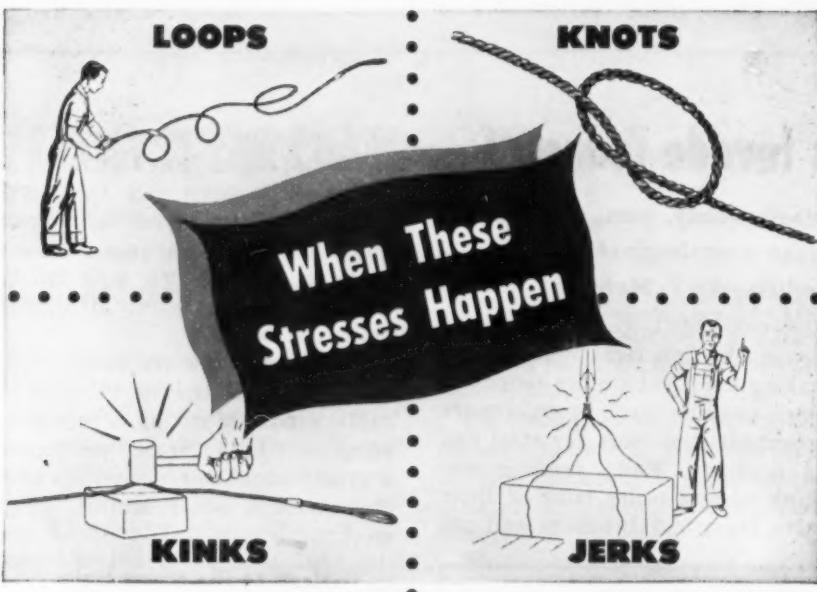
To illustrate the industry's growth, 25,000 cigarette machines in 1930 did a gross sales business of \$15 million—and today 480,000 are silently selling an annual \$700 million worth of cigarettes. While the number of machines has increased 18 times in the past 22 years, sales in the same time span have catapulted 45 times. This is a gage of public acceptance of automatic vending.

No More Shopping?

Most vending emphasis is turned to on-the-spot consumption of the many items sold but when the industry does any forecasting of future business potential it invariably harps on take-home use.

For instance, John Pero III, New York City representative of the industry, believes that the next stride will be in vending canned goods and other foods through apartment house basement machines. In fact, Maspeth, Long Island, has milk container machines in basements now. The Danes and Swedes have been selling a great variety of canned foods and household goods, through ma-

Turn Page



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Only Tuffy gives you the 9 part machine-braided wire fabric construction that (1) actively fights off knots and kinks, yet (2) stands up longer if such stresses of distortion occur. These two extra Tuffy advantages assure you of longer sling service that can help you save up to 40% on sling costs.

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Address _____ City _____ State _____

Machinery

CARBIDES: Solving Tough

High-speed steel lasted only 3 cuts . . . Cemented carbides boosted tool life 116 times.

Interrupted cutting is a real tool killer. But proper use of the correct tool bit can give a real boost to tool longevity. Here's a case in point:

One product of an agricultural equipment manufacturer is a corn husker with long slender rolls. The cast iron rolls contain many hard spots and sand inclusions and have numerous grooves which present unusually severe interrupted cutting conditions.

Pounding on a 10 hp lathe was so severe that the cross-slide feed handle had to be held with a C-clamp to prevent creeping. A roller steady rest was mounted on the cross-slide to support the $3\frac{3}{4}$ in. diam by 64 in. long work piece. But this bounced along with the cross-slide at every interruption.

Tool bits were of high-speed steel—and required regrinding after every three pieces. Trying to cut this frequent tool changing and increase output, the producer

Manufacturing

Continued

chines for years very successfully.

Last year William Filene's & Sons Dept. Store, Boston, sold everything from garters to pocketbooks through two batteries of machines installed in bus and airline terminals. Now pocket book and magazine publishers are testing the vending machine as a new retail medium.

As soon as steel and copper supplies loosen, vending machine makers will substantially increase production. One outfit reasons that it needs another 25 pct increase in output to meet demand. Beverage machine makers continue a little glum—for while steel may come into abundance later this year their production is governed by the number of syrup tanks they can get—and these can be made only of nickel stainless steel, an alloy much popular in our latest line of jet planes.

Tough Cutting Bug



CAST IRON Husker Rolls (severe interruptions) are being turned with Kennametal Clamped Tool Style BRH-20, Grade K6.

switched to cemented tungsten carbide bits.

These tools went 350 pieces before regrinding was necessary—providing 116 times better life.

First carbide tool used was a standard brazed-on-tip type made by Kennametal, Inc. To reduce breakage from the severe pounding it was necessary to modify them by increasing back-rake to 15° negative, change the end cutting edge angle to 30° and increase nose radius to 1/16 in. So altered, the tools lasted about 350 pieces before regrinding.

But there was still some breakage resulting from inherent brazing strains being aggravated.

To eliminate this, a Kennametal clamped-on-tip tool was tried with modifications similar to the first. Without thermal strains, breakage was eliminated and a full 350 pieces per grind was achieved. Grinding was cut about 99 pct.

Production Hiked

The switch to cemented tungsten carbides permitted speed to be doubled to 80 rpm and 78.5 sfpm. At the same depth of cut, $\frac{1}{8}$ to $\frac{1}{4}$ in., tool feed was boosted from 0.030 in. to 0.044 in.

The rolls, previously turned in 39 minutes, are now turned in 15 minutes and 16 pieces can now be produced in an 8-hr shift as compared to 11 before the switch.



STANDARDIZED • MASS PRODUCED • LOW PRICED

... give you advantages of the most expensive cranes

Now you can select your overhead electric traveling crane by size and type from a catalog. In the new standardized, mass produced Series "D" 'Load Lifter' Cranes you get a crane constructed on design principles that have made "Shaw-Box" Heavy Duty Cranes outstanding performers. For example, only in Series "D" 'Load Lifter' Cranes can you get these 8 crane bridge advantages:

LONG LIFE MECHANISM. All gearing in a sealed housing and operating in oil.

LOW COST OPERATION. Friction reduced to the minimum by supporting every moving part on ball bearings.

MAXIMUM STRENGTH with minimum dead weight because of advanced design and distribution of metals.

ACCURATE, EASY CONTROL. Variable-speed magnetic control and bridge brake to control drift assure accurate spotting.

MAXIMUM SAFETY. No open gearing. Cross wires are kept between and inside the girder flanges.

LOW MAINTENANCE. Motor and drive shaft are permanently aligned and all gearing operates in an oil bath.

EXCEPTIONALLY RIGID BRIDGE free from whipping and skewing because of its three-girder construction.

LONG WHEEL BEARING LIFE. Wheels are mounted on axles that rotate on ball bearings, equally loaded, on each side of the wheel.

Series "D" 'Load Lifter' Cranes are built in three basic types and three styles of trolleys with manually or electrically operated traverse motion. For floor-control a pendant type push button assembly is provided. On cage controlled cranes operation is by master switches. Get complete feature-facts about every capacity. Write for Catalog 221.

'Load Lifter' CRANES



MANNING, MAXWELL & MOORE, INC. Muskegon, Michigan

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, and 'American' Industrial Instruments.

DEMAND: Boosted By Good Supply

ECE calls for full use of new mills . . . Proper government and industry policy is vital . . . Excess capacity may be step one in helping push up demand—By F. H. Harley.

Now that the Schuman Plan has provided a common steel market in West Europe, what of supply and demand in that area? Previewing a major report to be issued this spring, the Secretariat of the United Nations Economic Commission for Europe, in Geneva, stressed the need for full use of efficient rolling mills.

Large Flat-Rolled Hike

Europe is planning large increases in output of flat-rolled steel, following the U.S. lead by installing many continuous wide strip mills. Cold-rolling and electrolytic tinning lines are also planned. This is a stage of profitably balancing steel product mix.

The Secretariat wants to boost demand to match expansion. ECE outlines the problem as two-sided: (1) A continued expansion of flat steel consumption is needed for full use of the modern facilities to keep costs to a minimum, and (2) maximum efficient utilization of new plants with resulting low prices is required to promote expanded consumption.

Major consumers of flat-rolled steel would be industries producing autos, consumer durables, containers and shipbuilders.

Plan 15 Mills

Based on American productivity, the theoretical annual capacity in western Europe of the continuous wide strip mills alone will be 17.3 million metric tons by 1956. Pre-World War II production of Europe's continuous wide strip mills was about 1 million tons a year. Production of all types of flat rolled steel, including plate and narrow strip, totaled 15.8 million tons in 1951.

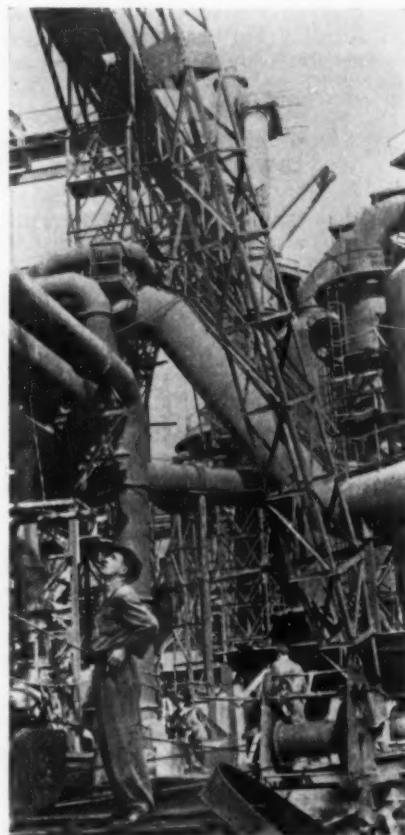
But under present plans the production of the 11 new continuous and semi-continuous strip mills and four Steckel wide strip mills

going into operation or being installed in western Europe will be only 9.7 million tons in 1956.

The Secretariat declares, "It would be easy to be pessimistic and argue that massive demand for flat products is one consequence of a high standard of living and it is not within the power of the steel industry to transform European standards of living nor, indeed can this be done overnight by any combination of governmental and industrial policies.

Availability a Factor

But, the agency points out, the continuous wide strip mill is one of the means for accomplishing this.



NEW BLAST FURNACE "C" of Kosciuszko Steel Plant in Upper Silesia, Poland, went into operation last month. It is said to be the largest furnace in the country.

Most important single element is an expansionist government policy, according to ECE. Next is confidence of the steel industry so that continuous mills may have their full effect in cutting costs.

A comparison of thin sheet expansion and demand in the U.S. and Europe was used to illustrate how growth and resulting lower prices could stimulate a big new demand for this steel item.

"Overexpansion" Cited

The forthcoming study will show that there was excess capacity in the U.S. for a number of years, said ECE, but this may be a necessary stage in growth and "need not be considered as a setback."

Tribute is paid the U.S. steelmakers who had the courage and foresight to raise production which, in turn, levered up consumption and the standard of living. "Taken together, these developments have not only made cheaper production possible, stimulating demand; they have also brought about a revolution in quality," a further stimulant.

Commenting on the striking growth of continuous wide strip mills in the U.S., the ECE Secretariat declares it is impossible to tell whether demand created the mills or vice versa. "But it is clear that as soon as the continuous wide strip mills came fully into operation the availability of reasonably cheap high quality flats stimulated demand, particularly in the container and oil industries."

Canadian Output at New High

New alltime records for steel and pig iron production were scored in Canada during 1952. A total of 3,721,692 net tons of ingots and steel for castings was poured as compared to 3,567,361 tons in the previous year.

Pig iron output totaled 2,682,065 tons in 1952, against 2,552,696 tons in 1951.

December steel production was 319,684 tons and blast furnaces above the border turned out 232,732 tons of pig iron during the month.

DECONTROL: No Fixed Timetable Yet

Ceilings will be lifted in a series of actions . . . Steel, copper, aluminum not yet "ready" . . . Congressmen disagree on holding emergency standby measures—By R. M. Stroupe.

Plans for future price decontrol moves embody a series of ceiling-lifting actions.

As Office of Price Stabilization last week swept price curbs from a sizable package of items, it retained restrictions on steel, copper, aluminum, major electrical appliances, industrial machinery, farm equipment, and a number of grocery articles. In the view of OPS Chief Joseph Freehill, these materials are not yet "ready" to go on the decontrol lists.

Won't Make Dates

When they will be considered ripe for removal of ceilings is undecided. Mr. Freehill promises more lists will come, but he avoids naming dates. Officially, there was no fixed decontrol schedule in being when OPS freed what items it did last week.

Remaining within OPS barriers after last week's action were about 17 pct of the goods on the government cost-of-living index. Seen from a different angle, about 50 pct, or less, of commodities on the Wholesale Price Index were still under price controls.

Noticeably reluctant to put itself entirely out of business, OPS is finding fewer materials require its attention and is trimming its central and field staffs. From a current roster of 4500 employees it expects to drop to 2500 by mid-March. Release notices effective in 30 days were issued by the agency this week.

Being Studied

While the area of OPS jurisdiction diminished, price controls are demanding attention at high government levels. Operating as a consultant in Office of Defense Mobilization is James F. Brownlee, partner in the firm of J. H. Whitney & Co. He has been conferring with Mr. Freehill and Eco-

nomic Stabilization Agency personnel, presumably on the case for standby wage-price curbs.

As expected, top-rung officials in the so-called stabilization bureaus are backing the argument for standby measures, while on Capitol Hill there is a division of opinion on their need. Senate Majority Leader Robert A. Taft, R., Ohio, and Rep. Jesse P. Wolcott, R., Mich., head of the House Banking Committee, have a considerable impact on fellow legislators when they say controls can be clamped on swiftly enough in a national crisis without the need for holdover restrictions.

Doesn't Agree

Sen. Homer E. Capehart, R., Ind., Senate Banking Committee chairman, doesn't agree that his powerful colleagues are right. His committee plans hearings, beginning Feb. 24, to determine what should be done about controls, with government witnesses scheduled as the first to testify.

The senator doesn't want a continuation of wage-price curbs in their present form. In a statement, however, he says that "I have always felt, and still do, that we ought to have a standby controls bill to be used the minute a national emergency occurs, rather



"Watch him. His vacation doesn't start till September."

than imposing controls after the inflationary spiral has started."

He called attention to the speed with which prices rose in the first few months after fighting began in Korea and stated that the situation "will happen again if we have another grave emergency without such legislation."

President Openminded

President Eisenhower is keeping an open mind on the question of standby machinery, Sen. Capehart says, adding that he had discussed the matter with him and with high-ranking officials in his Administration. He expressed pleasure at reports that the White House had ordered a thorough examination of all factors affecting the controversial standby authority issue.

It is Sen. Capehart's view that "once they have secured all the facts and see the problem in its proper perspective, they will favor standby controls to be used only in case of a grave emergency."

Consult With Board

A bill introduced by the senator would authorize controls by presidential action. As a rein on the President's authority, he would be required to consult with a "national advisory board," including representatives of business, labor, agriculture, and the public, before imposing any type of controls on any economic activity.

In his state of the union message on Feb. 2, the President did not ask for standby controls measures.

Analysts of that speech deduced that he saw no need to continue any wage-price restrictions.

What's Happening

Early this week, there were over 600 applications for price increases pending at the OPS Industrial Materials & Manufactured Goods Div. Breaking these down by industry category is a time-consuming chore that had not been accomplished. OPS has a total of 1225 applications, including those named above, at various stages of study.

Controls

Industry Controls This Week

Automotive—Amend. 35, GOR 9 removes price controls from all used pre-1946 passenger autos.

Bolts, Nuts—Amend. 1, SR 1, CPR 118 permits certain producers of bolts, nuts, screws and rivets to apply for an adjustment of ceiling prices established under CPR 118.

Castings—Amend. 1, SR 4, CPR 60 clarifies the basis of applying the Industry Earnings Standard ceiling price increase recently authorized for producers of high alloy steel castings.

Caps—Amend. 9, GOR 8 exempts from price controls manufacturers' sales of milk bottle caps, including those made of aluminum foil and black plate.

Copper—Amend. 4, CPR 110 establishes dollar and cents ceiling prices for certain copper wire mill products and for certain reel sizes and constructions. SR 133, GCPR authorizes an increase in ceiling prices on beryllium copper base alloys.

Durable Goods—Amend. 15, Rev. 1, GOR 5 exempts and suspends price controls from a number of consumer durable goods and related commodities.

Nickel—Amend. 1, SR 33, GCPR permits primary nickel sellers to raise ceiling prices 3½¢ per lb.

Resellers—Interp. 2, CPR 98 clarifies the definition of a warehouse reseller.

Steel—Amend. 5, SR 100, GCPR gives producers of iron and steel products the option of rounding their ceiling base prices and extras expressed in dollars and cents per unit, rather than rounding their total ceiling prices.

Steel Wool—Amend. 34, GOR 9 exempts from price controls all sales of industrial steel wool.

Toys—Amend. 13, Rev. 1, GOR lift price controls from toys and games.

Non-Quota Steel Sales Continued

National Production Authority last week extended through the second quarter the authorization for manufacturers of A and B products to purchase carbon conversion steel on an ex-allotment basis.

Extension of the authorization enables users of conversion steel to obtain additional quantities without affecting military supplies, NPA said.

Defense Contracts

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Pinion elevating, rear sight assy, 700000, \$511,000, New Haven Clock & Watch Co., New Haven, Conn.

Repair parts for diesel engines, 176521, \$252,192, General Motors Corp., Detroit, J. E. McKenna.

Spare parts for sound projectors, 50390, \$125,515, Ampco Corp., Chicago.

Up pair parts for pumps, 3857, \$83,463, Buffalo Pumps, Inc., Buffalo.

Battery chargers, 255, \$113,650, P. R. Mallory & Co., Inc., Indianapolis.

Replenishment of motor vehicle parts, 16000, \$111,520, W. D. Bright Enterprises, Witham, Mass.

Replenishment of hardware, 55000, \$95,-480, L & S Bearing Co., Oklahoma City.

Table, operating, 90, \$148,249, American Sterilizer Co., Erie, Pa.

Table, operating, 210, \$148,365, Shampaine Co., St. Louis.

Cartridge carbine, 25000000, \$1,375,000, Remington Arms Co., Bridgeport, Conn.

Primer percussion, 1673675, \$718,017, Eagle Lock, Terryville, Conn.

Liner for deep cavity shell mts, 300000 ea, \$151,800 American Metal Prod. Co., Inc., Bridgeport, Conn.

Adapter, cylindrical aluminum, 875 ea, \$62,746, Waycross Mach. Shop, Waycross, Ga.

Plugs, dummy nose, 150000 ea, \$119,010, Irwin Williamson Mfg., Wayne, Pa.

Torpedo shipping containers, 1700 ea, \$342,499, Chattanooga Boiler & Tank Co., Chattanooga, Tenn.

Aircraft fire control system, 320 ea, \$4,-491,688, Magnavox Co., Ft. Wayne, Ind.

Magazine, 1388 ea, \$1,130,707, Ryan Industries, Inc., Detroit.

Propellers, control parts and subassemblies, \$595,000, Norman Willets Co., Chicago.

Cylinder, gas empty with valves, 5000, \$157,650, Harrisburg Steel Corp., Harrisburg, Pa.

Shell, HE, 105 MM, 1830200, \$10,834,784, Kilby Steel Co., Anniston, Ala.

Case, cartridge, 500000, \$2,455,000, Kilby Steel Co., Anniston, Ala.

Shell, HE, 90 MM, 438000, \$2,470,320, Harris Foundry & Machine Co., Cordele, Ga.

Spare parts for tank 90 MM gun, 1 set, \$3,517,500, Chrysler Corp., Detroit.

Primer, percussion, 15000 units, \$119,-790, Ocean City Mfg. Co., Philadelphia.

Shell, HE, 107, 155 MM, 500000 ea, \$8,560,000, U. S. Hoffman Machinery Corp., New York.

Spare parts for maintenance of airships, var, \$123,738, Goodyear Aircraft Corp., Akron.

Signal generator equip spares, 400 ea, \$154,890, Transiltron, Inc., New York.

Aircraft fire control system, 500 ea, \$6,-001,748, Emerson Radio & Phonograph Corp., New York.

Spare parts for P & W engines, var, \$106,369, United Aircraft Corp., East Hartford, Conn., E. E. Champion.

Spare parts for propellers, var, \$1,560,-754, United Aircraft Corp., East Hartford, Conn., E. E. Champion.

Spare parts for P & W engines, var, \$171,541, United Aircraft Corp., East Hartford, Conn., E. E. Champion.

Spare parts for P & W engines, var, \$112,799, United Aircraft Corp., East Hartford, Conn., E. E. Champion.

Spare parts for P & W aircraft, var, \$377,339, United Aircraft Corp., East Hartford, Conn., E. E. Champion.

Spare parts for P & W engines, var, \$622,552, United Aircraft Corp., East Hartford, Conn., E. E. Champion.

Spare parts for P & W aircraft engines, var, \$1,041,202, United Aircraft Corp., East Hartford, Conn., E. E. Champion.

Maintenance parts used on pump assys, var, \$518,021, United Aircraft Corp., East Hartford, Conn., Adam C. Wolz.

Spare parts for P & W engines, var, \$294,197, United Aircraft Corp., East Hartford, Conn., E. E. Champion.

Parts for aviation armament, var, \$823,-962, Hughes Aircraft Co., Culver City, Calif.

Valve assy, var, \$210,862, Parker Appliance Co., Cleveland.

Oscilloscope & spare parts, var, \$67,782, Lavoy Laboratories, Inc., Morganville, N. J.

Maintenance parts for propeller & deicer, var, \$818,660, United Aircraft Corp., East Hartford, Conn., Adam C. Wolz.

Spare parts & components covering C-119F aircraft propeller equip, var, \$1,-241,992, United Aircraft Corp., East Hartford, Conn., Adam C. Wolz.

Parts for maintenance of integral oil control assy, var, \$1,159,767, United Aircraft Corp., East Hartford, Conn., Adam C. Wolz.

Spare parts for P & W aircraft engines, var, \$1,041,202, United Aircraft Corp., East Hartford, Conn., E. E. Champion.

Maintenance parts used on J40-WE² engines, var, \$82,881, Westinghouse Electric Corp., Philadelphia, W. C. Wilson.

Construction

Steel Inquiries and Awards

Fabricated steel awards this week include the following:

1025 Tons, Boston, Mass., new \$1,750,000 physical education and gymnasium building for Northeastern University on Huntington Ave., Back Bay through John A. Volpe Construction Co., Malden, Mass., to Grosseter and Shlager Iron Works, Somerville, Mass.

500 Tons, Moundsville, W. Va., new building for the Solvay Process Div. of Allied Chemical & Dye Corp., to Grosseter and Shlager Iron Works, Somerville, Mass.

400 Tons, New Haven, Conn., new post office building to Grosseter and Shlager Iron Works, Somerville, Mass.

Fabricated Steel Shipments

December bookings of fabricated structural steel, as compiled from reports received by the American Institute of Steel Construction, amounted to 236,264 tons, an increase of 16% from the previous month. Total bookings for 1952 were 2,503,521 tons.

Shipments for December increased slightly over the previous month and were 11% greater than the corresponding period of last year. Shipments for the twelve months of 1952 totaled 2,664,255 tons.

The backlog of work ahead as of December 31 stands at 2,152,714 tons.

A tabulation showing the detailed figures for the twelve months is given below.

Estimated Total Tonnage for the Entire Industry

CONTRACTS CLOSED	1952	1951	Avg. 1947-1950
Total Tonnage			
January	213,110	361,373	161,976
February	230,832	256,746	152,188
March	226,394	297,517	221,387
April	209,106	337,026	177,825
May	209,888	268,166	176,266
June	167,492	207,966	196,725
July	221,559	222,540	223,334
August	252,849	212,730	212,899
September	207,695	188,187	215,876
October	184,331*	183,921	223,286
November	144,001*	192,065	194,380
December	236,264	202,835	207,912
Totals	2,503,521	2,931,072	2,370,040

SHIPMENTS

January	244,947	214,000	166,910
February	246,398	193,638	161,170
March	268,840	237,087	191,297
April	230,670	234,095	192,861
May	244,222	234,486	198,426
June	125,486	257,066	192,851
July	138,267	204,380	183,329
August	226,277	236,915	204,948
September	227,595	228,296	197,331
October	262,730*	240,056	185,785
November	223,662*	219,564	182,249
December	225,161	202,679	199,379
Totals	2,664,255	2,702,262	2,256,536

TONNAGE OF BACKLOG 2,152,714 2,670,202 1,423,620

Percentage scheduled for production within the next four months

(To April 30) 48% 44% 51%

Percentage scheduled for production after the next four months

(From May 1) 52% 56% 49%

* Revised

THE IRON AGE

there's more to rubber than

Stretch



The most important factor about any rubber part is its ability to do the job for which it is intended. While the slingshot requires stretch only, industrial rubber parts must have resistance to oils, chemicals, weather, temperature extremes or combinations of these deteriorating factors.

STALWART engineers have the experience and facilities to compound stocks and fabricate rubber parts which will serve your needs best. From more than 500 different rubber stocks at their disposal they can mold, extrude, die-cut, lathe-cut or mandrel-build shapes to meet individual, S.A.E. or A.S.T.M. specifications. These parts will retain their desirable physical, chemical and dielectric properties under severe operating conditions and give optimum performance in each application.

Specify **STALWART** rubber parts for that one essential quality . . . the ability to do a job . . . best.

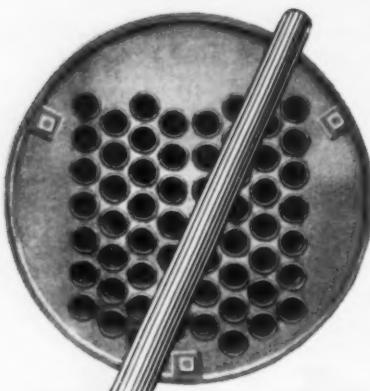
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Boiler tubes

Uniform strength, accurate dimensions and high ductility are three of the many qualities found in Murray boiler tubes. Welded or seamless tubes in sizes ranging from $\frac{5}{8}$ - to 8-inch OD are available for immediate shipment from warehouse stocks.

If you have a tubing problem, the experience of our specialists and the research facilities of our suppliers are at your service.



Other Murray products include carbon and stainless steel tubing and pipe for pressure and mechanical purposes; welding and screw type pipe and tube fittings. Tube bending, upsetting, swaging.



Industrial Briefs

Opens Warehouse . . . STANDARD PRESSED STEEL CO., Jenkintown, Pa., has opened a warehouse at 815 N. Sepulveda Blvd., El Segundo, Calif.

Christened . . . JONES & LAUGHLIN STEEL CORP., Pittsburgh, recently christened a new diesel towboat on the wharf at the foot of Poplar St., St. Louis. The vessel was christened "Aliquippa" by Mrs. C. W. Gottschalk.

Institute Chairman . . . CHICAGO ELECTRO-PLATERS INSTITUTE, Chicago, has elected Lawrence J. Hay, president of Plating Service Co., its chairman.

Shelling Out . . . DEPT. OF THE ARMY reports that more than 52 million rounds of artillery ammo and in excess of 3 billion rounds of small arms ammo, valued at about \$2 billion, was produced by U. S. industry and Army Ordnance plants during 1952.

Maine Manganese . . . A government-supported research program on extraction of low-grade domestic MANGANESE ORES has been broadened to include ores produced in MAINE. Some congressmen had complained that a government contract negotiated last fall with Southwestern Engineering Co. was discriminatory. It was extended to other areas.

Buys Company . . . SOLAR STEEL CORP., Cleveland, has purchased the business of United Steel Products, Inc., Worcester.

Created . . . AMERICAN CAN CO. has created a new division concerned with converting experimental containers to commercial use by finding ways to mass produce them on high speed manufacturing lines.

Keep 'Em Rolling . . . THE TIMKEN ROLLER BEARING CO., Canton, Ohio, rolled 28,559 net tons of steel during January, which broke the previous record of 28,023 established in March, 1942.

Expanding . . . REULAND ELECTRIC CO., Alhambra, Calif., has completed negotiations for the purchase of a 12-acre factory site located on Highway U. S. 16 between Detroit and Lansing, where construction of office and factory buildings is scheduled to start early this spring.

New Rep . . . TACO WEST CORP. Chicago, has appointed the Control Equipment Co., Atlanta, to represent them in Georgia, eastern Tennessee, Alabama and northern Florida.

Distributor . . . FRUEHAUF TRAILER CO. has appointed Brown Equipment & Mfg. Co. a distributor for Fruehauf trailers, parts and accessories.

New President . . . THE ALUMINUM ASSN., New York, has elected D. A. Rhoades, Kaiser Aluminum & Chemical Corp., Oakland, Calif., its president for 1953.

Elbow Room . . . LURIA ENGINEERING CO., is constructing a new 14,400 sq ft lumber storage building for the Empire Millwork Corp., an addition to its present plant at Northern & Willets Points Blvds., Corona, N. Y.

First Time . . . THE YALE & TOWNE MFG. CO., Stamford, Conn., for the first time in its 85-year history is now producing a new full line of locks and builders' hardware fabricated of aluminum for the full range of normal applications.

Dedicated . . . KOPPERS CO., INC., dedicated its new plant in Fontana, Calif., recently with a plant tour and luncheon attended by more than 400 industry, business and civic leaders of the Fontana and Los Angeles areas.

Purchased . . . DETROIT HARVESTER CO. reports the cash purchase of the Pioneer Pump & Mfg. Co. of Detroit.

California Branch . . . The first Bay Area branch of RESA (Scientific Research Society of America) was organized at STANFORD RESEARCH INSTITUTE, Stanford, Calif., recently by 70 charter members and all members of the institute staff.

Atlanta Warehouse . . . A. MILNE & CO., New York, has opened a new warehouse at 753 Chestnut St., N. W., Atlanta.

Unveiling . . . EUTECTIC WELDING ALLOYS CORP., Flushing, N. Y., will unveil new joining techniques and materials at the Western Metal Exposition in Los Angeles, Mar. 23-27, at Booth 503.



Rome-Turney water-cooled condenser coil.
Tube is $\frac{5}{8}$ " O.D., .042" ga., bent on a
 $1\frac{1}{8}$ " centerline diameter. Soldered helical
fins are .135" wide, spaced 14 turns
to the inch. Other types of heat ex-
changer coils are also shown. Rome-
Turney forms coils out of tube up to 40
feet long, without joints.

For Copper Tube that can be BENT

Rome-Turney sees REVERE

Most of the Revere Metals are fabricated by usual methods into conventional products. Some of them, however, appear on the market in forms that are unusual and possess special advantages. Take these helical-finned copper coils produced by the Rome-Turney Radiator Co., Rome, N. Y. It takes extra skill to produce coils with such small radii. The company can produce the coils shown on a commercial basis, for use in air conditioning apparatus, air compressors, and general heating and cooling applications where compactness plus high heat transfer rates are essential.

How it is possible to make such tight turns is Rome-Turney's secret. Revere does not share in it, nor does Revere want to reveal a secret of its own, which is how we turn out copper tube in a special bending temper for an application such as this. All we can say is that the two methods dovetail very nicely. If you need copper tube that can be bent easily, and offers you as well the advantages of corrosion resistance, high heat transfer,

easy joinings, see Revere. We also make copper pipe, tube in copper alloys, aluminum alloys, and electric welded steel tube. If required, the Technical Advisory Service will gladly collaborate with you, as it has with Rome-Turney, on selection and specification matters. Get in touch with the nearest Revere Sales Office.

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The Automotive Assembly Line

Hunt For Cheaper Production Goes On

Automakers continue striving for cost cutting . . . Quality, production control grow . . . Foundries push automation . . . Materials handling now biggest field—By R. D. Raddant.

The auto industry is always confronted with the never ending job of finding new frontiers for cutting costs, saving materials, cutting waste, speeding assembly.

Any company that stands pat on this year's methods is apt to find itself bringing up the rear in next year's production records. There is

expected to creep to parts suppliers to bring them in line with parent companies. New statistical techniques and inspection tooling are becoming more vital in the demands of today's highly mechanized and automated plants.

Production control is equally important. Accepted practices of

is receiving the attention that its cost cutting chances deserve.

Forging methods are also receiving their share of interest. During the past year one automatic forge line was developed in the auto industry and others are certain.

Can Be Improved . . . Some other directions in which production can be improved include grinding and cutting, preventative maintenance of plant equipment, progressive assembly techniques, hot and cold extrusions, and, of course, complete automation.

Production engineers will go to the mat with all these problems at SAE National Production Meeting and Forum in Cleveland, Mar. 25-27. This section of SAE has made wide use of the forum technique with panel leaders, secretaries and distinguished panel members at each session. It may well be the best open discussion of factory methods in industry.

Start Stamping . . . Fisher Body is just about ready to start stamping out auto body components at a new 1,481,100-sq-ft fabricating plant on Chicago's southwest side.

The new plant will follow a trend previously indicated by this body building division of GM of moving some of the fabricating plants closer to steel sources. Other new fabricating plants are located in Pittsburgh, Hamilton, Ohio, and Cleveland.

Decentralize . . . During 1952 Fisher Body disclosed plans for decentralizing its steel purchasing activities to the plant level. Apparently this decentralization is coupled with the strategic location of fabricating activities. The plan is to make the best advantage of plant location in relation to steel supply as well as to location of assembly plants.

Fisher Body, it is hardly necessary to point out, makes bodies for all GM car divisions. It is obvious that the division must be one of the largest single users of steel in

no time to rest on laurels in the hotly competitive race for first place in automotive position.

Output Is Boss . . . For this reason, the national production meeting and forum of the Society of Automotive Engineers has become one of the most important of SAE's activities. Not to take anything away from the car itself, but in the last analysis production frequently determines leadership.

A glance down the list of a dozen topics production engineers will discuss at this year's meeting provides an inside look at the areas where they believe the biggest advances will come.

Quality Control Spreads . . . It is no secret among engineers that quality control has reached across broad segments of the industry, in many cases covering all elements of manufacturing operations.

Principles of quality control are

stocking, handling, and material flow are constantly being improved to assure uninterrupted output.

Heat on Foundries . . . New foundry techniques provide some of the most controversial issues in the industry. Under the terrific demands of production, foundry operations are becoming more automatic.

Core blowers have become universal and one auto company is reported to be blowing molds successfully. Shell molding is a hot item. The plant that brings its cost down to production requirements will get a big jump on the industry.

Heavy Handling . . . More than a third of automotive production costs are eaten up by materials handling. This particular phase of production provides the best frontier remaining for cutting production costs.

Until a few years ago this was a virtually unexplored field. Today it

Automotive News

the country. Therefore, it must take steel supply into consideration in selecting plant sites.

There's A Difference . . . Fisher plants are located at all GM assembly points where finished bodies are turned over for final assembly. The fabricating plants require different considerations. Here just about the only raw material is steel sheet and strip. Parts are stamped out and panels, roofs, and other parts are fabricated for shipment to assembly plants.

The new plant will also be another unit in the GM dual purpose plant program. Fisher will occupy one half and the other half will be filled by Buick jet programs.

The Fisher Body section will be divided into two parts, one for stamping and fabricating, the other for the production of large stamping dies and tools. In all, 240 large presses will be deployed in 28 production lines. When production reaches capacity, 3950 workers will be employed on two shifts.

Don't Like It . . . Fact that competition and not price controls is the dominant factor in auto prices today indicates the reluctance of the industry to boost prices. If the extra costs now being incurred by conversion steel should ease shortly, there would be little reason to raise retail car prices even in the face of higher materials costs.

This is a general conclusion and does not apply to individual car manufacturers. In some cases where the backlog is great, increase might be forthcoming. And prices of some of new luxury models and sports cars may be reviewed.

GM Suggestion Box Stuffed Full

General Motors' employee suggestion plan continued to boom during 1952, reflecting increased employee interest. It's a profitable interest too, with awards made totalling \$1,678,372 for 33,863 suggestions adopted during the year.

Awards for suggestions that result in labor or materials savings are calculated on the basis of one-sixth of its annual gross savings. This indicates that the system

serves a dual purpose of stimulating job interest and at the same time resulting in measurable benefit to the company.

Popular Idea . . . Harry W. Anderson, vice-president in charge of personnel staff, said that in 1952 GM employees submitted a record 144,890 suggestions, 33,863 of them adopted. During the year 64,909 GM employees turned in one or more suggestions.

Maximum award in the GM plan is a \$2500 U. S. Savings bond. In the 2 years the top award has been in effect, 72 ideas earned the maximum.

PROFITS:

Chrysler report shows high profits, taxes, lower unit sales output.

Chrysler Corp., first major auto company to report 1952 financial results, turned in some conclusions that may apply industry-wide when the broader picture is put together.

These are: Higher profits for fewer unit sales; higher taxes that reflect the highest total of federal

taxes on income in the company's history; defense cutbacks in some directions and increases in others; and a general blaming of the steel strike that forced a loss of production, then required higher cost operations to make up for lost time during the remainder of the year.

Taxes Take Bite . . . Chrysler's net sales reached \$2,600,958,683 in 1952 against \$2,546,678,799 in 1951. Net earnings for 1952 reached \$78,696,599 in 1952 against \$71,973,469 in 1951. Total taxes reached a monumental \$369,103,523 last year against \$239,859,709 in 1951, a tax rise of 53.9 pct.

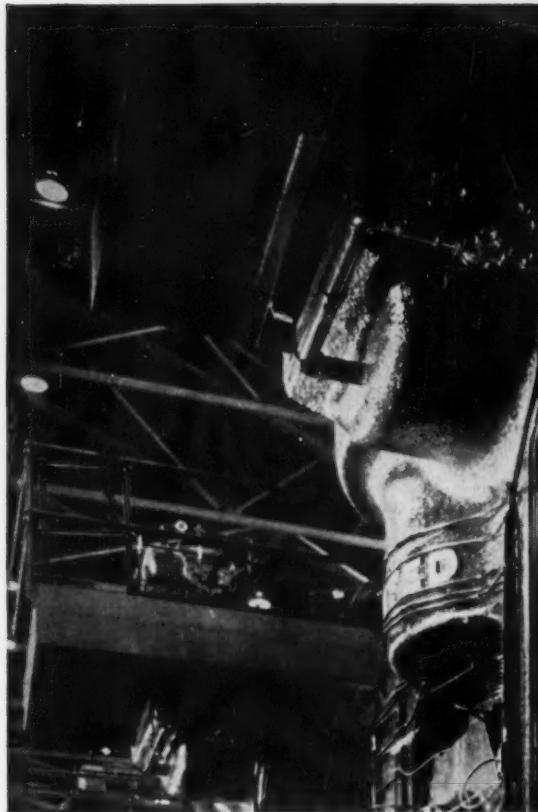
Unit sales slumped from 1,395,833 in 1951 to 1,114,228 in 1952, a drop forced by NPA quotas. The increased sales compared to lower unit sales is attributed to a relaxing of price controls and to an increase in defense business.

The 1952 military volume reached \$360 million against \$76 million in 1951, despite cutbacks in some vehicle schedules and aircraft program. Other contracts, principally in tanks, bolstered the defense work.

THE BULL OF THE WOODS

By J. R. Williams





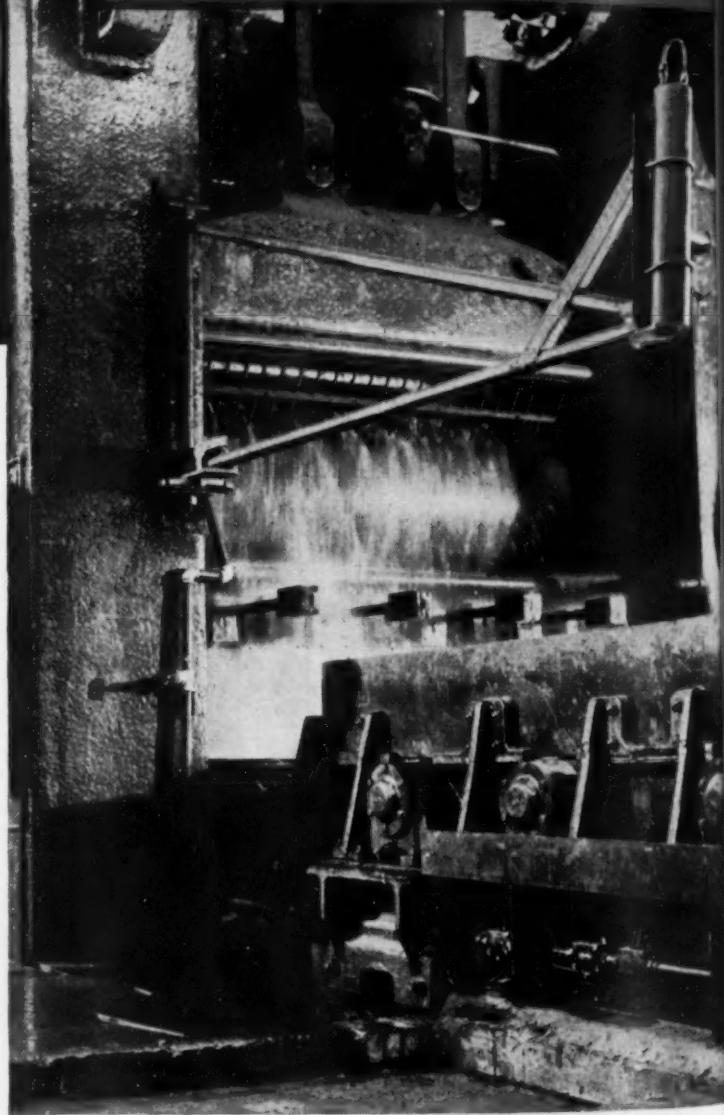
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This Week in Washington

GOP Gets Budget Cutting Challenge

GOP congressmen must prove they keep campaign promises to cut Washington spending . . . White House leads with orders to trim agencies . . . Democrats "alarmed"—By G. H. Baker.

President Eisenhower's clear demonstration that he intends to lead the way in cutting government expenses raises an interesting challenge to Congress: Republicans now must demonstrate whether they intend to keep campaign promises to cut federal spending. "Put up or shut up," as one member puts it. Democrats, gleefully picking up the challenge, are crying that the new reductions ("alarming," say some) ordered by the White House are "crimping" the defense effort.

Losing Weight . . . Economies already in effect by White House orders include some drastic trimming of several swollen "defense" agencies. Termination notices have been sent to nearly all employees of such agencies as Office of Price Stabilization, Wage Stabilization Board, Salary Stabilization Board, Railroad & Airline Wage Board. Defense Production Administration was wiped out and its "functions" transferred to the Office of Defense Mobilization. Economic Stabilization Agency, "holding company" for the price and wage control offices, is all but abolished.

Cutting Down . . . Defense Materials Procurement Agency is being trimmed drastically. Core of its buying functions is to be transferred to General Services Administration.

Defense Transport Administration is earmarked for drastic reduction, possible elimination. Federal Civil Defense Administration has been ordered to transfer many of its duties to state and local levels.

Dead On Its Feet . . . National Security Resources Board was set up by Congress after World War

II as the master planning agency for future mobilization. In this capacity, it didn't get off the ground. ODM took over the mobilization job. It is headed for complete oblivion unless there is a last-minute decision to keep it in business for the purpose of planning industrial defense against enemy action.

Council of Economic Advisers is

Signs of the Times (Washington Div.)

Electric computers used to measure flow of highway traffic between Washington and suburban Arlington, Va., are reflecting the new tempo of activity along the Potomac. Peak of morning rush-hour traffic is now 21 minutes earlier than it was under the Truman Administration, highway engineers discovered. Homeward bound late afternoon peak remains the same. One of the new Administration's first housekeeping moves was an order to government workers to put in a full day's work for a full day's pay.

slated for drastic cutbacks in personnel and appropriations. Federally-owned and operated barge lines have been put up for sale to private firms by Secretary of Commerce Sinclair Weeks.

When He Wants . . . President Eisenhower's hands-down victory over Congress in winning the reorganization powers held by ex-President Truman means that he now has clear-cut authority to put Hoover Commission (on reorganization of the Executive Branch) recommendations into effect at his pleasure, subject only to a vote of

negation by congressional action.

Thus, unless Congress specifically denies him the authority to act on any one reorganization proposal, any projected streamlining goes into effect automatically 90 days after its proposal. The ambitious and apparently sincere efforts to cut spending made thus far seem to indicate that further reductions are in the offing.

More Interference . . . Legislation has been proposed in Congress which would put the government further into the metal-buying business under the guise of stabilizing the price of critical type metals and minerals.

Under a measure (S.869) introduced by Sen. Edwin C. Johnson, D., Colo., the government would set up a new agency for the purpose, and call it the Metals Credit Corp.

It would be authorized to obtain between \$6 billion and \$7 billion in Treasury credit for the purpose of manipulating the market and prices in much the same way as farm prices are supported by the Commodity Credit Corp.

What It Says . . . Specifically, the bill authorizes the proposed MCC to buy, warehouse, and sell to industry in such way as to encourage domestic production if prices are low and to help supply industry if scarcity runs up prices.

No specific metals or ores are mentioned in the proposal. Broad authority would be given to extend operations to cover any metal or ore held to be critical or strategic under the Stockpiling Act.

Tito Gets Loan . . . Metals industries in Yugoslavia are slated to benefit by gaining a lion's share of the new \$30-million loan granted by the World Bank.

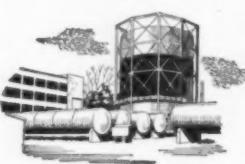
Other Yugoslavia industries headed for expansion as a result of the grant are iron, coal, electric power, manufacturing, transportation, and forestry.

World Bank officials say some of

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RELIABILITY: You can depend on Philgas, a top-quality Phillips product, for uniform gravity and high thermal value. Exceptionally clean, too . . . free from harmful contaminants.

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Washington News

the projected expansions will be completed within 2 years. All are scheduled for full operation by 1956. Estimated result: A 30 pct overall increase in Yugoslavia industrial production by 1955.

Projects to be completed with the aid of the loan should improve Yugoslavia's balance of payments position by the equivalent of \$50 million annually through increased exports, reduced imports, increased industrial efficiency, reduction of manpower requirements and lower production costs.

More Money for Military

Allocation of more military aid money to the Defense Dept. in this fiscal year is expected to boost total funds available for military hardware since the Korean fighting began to about \$99 billion.

Military assistance funds are appropriated to the President and allocated to Defense Dept. by the Mutual Security director. Indications are that some \$4 billion in these funds will be used for procurement of fighting goods in fiscal 1953. In the first 6 months of the year, \$2.9 billion was turned over to Defense Dept.

Air Big Spender

During the same months, the military departments obligated \$17.6 billion for major equipment and supplies, military building and plant expansion. More than half this amount, or \$9.4 billion, was accounted for by the Air Force. The Army and Navy each obligated \$4.1 billion.

Obligations for hard goods of the plane-tank-gun type by the three services totaled \$14.7 billion. Clothing, subsistence, and fuel obligations required \$1.7 billion, and construction \$1.2 billion.

Complete Defense Dept. obligations for the half-year, including such large categories as military pay and allowances, amounted to about \$27.2 billion.

In the first 30 months after the Korean emergency began, Defense Dept. obligations reached \$138.7 billion. Of this amount, \$82.5 billion was slated for hard goods.

TAXES:

New Assistant Commerce Secretary favors tax ceiling, few curbs.

Close attention to controls on critical products and materials will be part of the new job assumed last week by Craig R. Sheaffer, Ft. Madison, Iowa, new Assistant Commerce Secretary for Domestic Affairs.

As he was sworn in, the ex-president of W. A. Sheaffer Pen Co. said there may be a need for "very

ent tax rates, he said, will do "immeasurable" damage to younger people if they see no way of making and retaining money.

Plow Back Profits

The proposal that there be a 25 pct limit on federal taxing power, he testified, would allow small business to plow back more profits into their enterprises. He said he does not intend, though, to push the plan as a Commerce Dept. official.

Firms of which Mr. Sheaffer is



CIVILIAN AIDES pose with Defense Secretary Charles E. Wilson (seated). Left to right, W. J. McNeil, assistant secretary, Roger M. Kyes, deputy secretary, John A. Hannah, assistant secretary for manpower, and Frank C. Nash, assistant secretary for internal security.

limited" controls on certain scarce items. He added that "we are anxious to see decontrol accomplished as fast as possible."

Mr. Sheaffer forecast a continuing high level of business activity ahead for the nation.

Favors Tax Ceiling

When testifying before the Senate Commerce Committee prior to confirmation of his appointment, he said he advocates a fixed point or percentage beyond which federal taxes could not go.

Mr. Sheaffer asserted that present tax rates "border on confiscation" and that the pen company founded by his father could not have developed under them. Pres-

a former director are Keokuk Electro-Metals Co. and Northwestern Bell Telephone Co. He is a trustee of Iowa Wesleyan College and the Midwest Research Institute.

Land Transportation Study Set

A Joint Land Transportation Agency has been set up within the Defense Dept. for mapping plans for military use of land transport facilities during emergencies that may arise.

It will consist of three members, one each from Army, Navy, and Air Force, with the Army member in charge. Military and civilian personnel will make up planning staff.

Here at Sterling Bolt Co., a single, integrated DEPENDABLE source can supply you with more than 200,000 stock and standard sizes in Bolts, Nuts, Screws and Washers for your specific needs.

For more than 35 years Sterling Bolt has been a prime supplier of metal fastenings to America's best-known companies—because Sterling facilities combine both warehouse and mill, giving you advantages of PROMPT SERVICE and COMPETITIVE DISCOUNTS.



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West Coast Report

Pacific Coast Ship Yards Gain, Lose

Maritime Commission program, carrier conversion brings business . . . But foreign competition takes other jobs away . . . High scrap stock cuts prices—By T. M. Rohan.

Western shipbuilding took one step forward and one backward last week.

Bethlehem's San Francisco yard laid the keel for its second \$9.4-million, 21,050-ton Maritime Commission cargo ship in its \$47 million program of five ships. But across the bay a burned oil tanker sold for scrap was being braced for towing across the ocean to Japan for reconversion.

Clear Decks . . . In the San Francisco naval shipyard the decks were being cleared for the \$62-million conversion of the aircraft carrier *Bon Homme Richard*, due in the bay late this month from Pacific maneuvers. But rumors from Washington indicated the yard would lose its \$18-million amphibious tractor conversion project to neighboring Mare Island shipyard at Vallejo to make room for the conversion of the incoming ship.

The former Union Oil Co. tanker *Victor H. Kelly* was destroyed by fire, declared a total loss by underwriters and sold for scrap to Learner Co. of Oakland. Learner sold it to National Bulk Carriers of New York, which has a long term lease on the old Kurie Japanese navy yard.

Costs Cut . . . Front section will be enlarged and an extra tank added for about \$1 million less than half the cost in the U. S. Use of a Dutch tug for the towing job will also cut costs.

Foreign construction jobs of Standard Oil of California and Hillcone Steamship Co. of San Francisco and many others across the nation have boosted low cost foreign shipbuilding to quadruple or more the activity in U. S. yards.

Scavenger Hunt . . . The old western prospectors are back in business. Like the California '49ers, 175 independent prospectors and 208 firms are scouring the Rocky Mountain area for strategic metals.

Under a Defense Minerals Exploration Administration project for \$18.9 million for 50 to 90 pct of the cost, the search is on for copper, lead and zinc as well as tungsten, antimony, mercury, manganese and other deposits. Of the total \$18.9 million, DMEA is spending \$8.3 million and private firms \$5.3 million.

Scrap Drops Again . . . Tons of scrap in mill yards pushed western scrap prices down the second time in 2 weeks. In San Francisco and Los Angeles No. 1 bundles dropped \$4, No. 2 heavy melting \$1, and No. 2 bundles \$3.

In Seattle, where the market is traditionally stronger, No. 2 heavy melting dropped from the \$34 ceil-

ing to \$29. And with the end of price controls, mills were considering reviving old commercial classifications such as No. 3 bundles and others.

Shell Molding . . . The boys from Stanford are in business. Students there who developed a small shell molder last year as a school project, last week had formed a corporation with locally raised capital. They already had ten orders from as far as Chicago, and were quoting 1-month shipment. They have also licensed the Connellsville Mfg. & Mine Supply Co. of Connellsville, Pa., to manufacture them in the East.

The Shalleco Engineering Corp., named for Prof. Frank K. Shallenberger of Stanford, who started it all, takes pattern sizes to 14 x 18 in. Estimated production is 45 sec per shell or 30 pct better than most competitive machines, due principally to use of two dump boxes for molding resin.

Warehouses Gaining . . . Western steel warehouses are getting back on the track after a long drought. Inventories are back to about 50-60 pct normal after a low of 25-35 pct last fall. Deliveries of locally made bars and shapes are greatly improved.

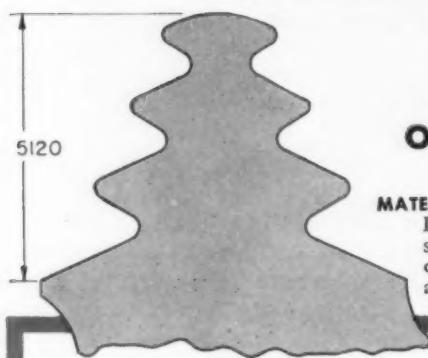
Only shortages are in sheets, carbon bars over 3 in., heavy plates, and cold rolled sheets, much of which come from the East.

Only items on which price might go up after decontrol are expected to be stainless steel and alloys, but these are expected to be minor.

Early Bird . . . Kaiser Steel last week applied for a \$52 million Defense Production Authority necessity certificate but is not exactly certain what it will be used for. The certificate is a prerequisite to sound financing and will probably cover additional rolling and blooming mills and a tinplate coating mill, depending on tin can makers' specifications.

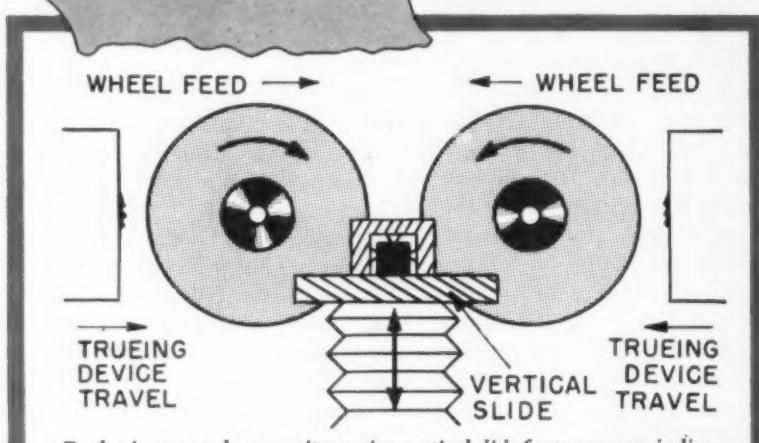


FORM GRINDING JET ENGINE BUCKET ROOTS FROM THE SOLID!



ON J & L DUAL-WHEEL AUTOMATIC FORM GRINDER

MATERIAL BORDERS ON UNMACHINABLE
Intense heat and great centrifugal stresses on the pressure surfaces require the toughest material and most accurate finish.



Bucket is mounted on a reciprocating vertical slide for two-way grinding.
AUTOMATICITY SPEEDS PRODUCTION — MAINTAINS REPETITIVE ACCURACY — Operation is simplified to the push button stage by a completely automatic work cycle.

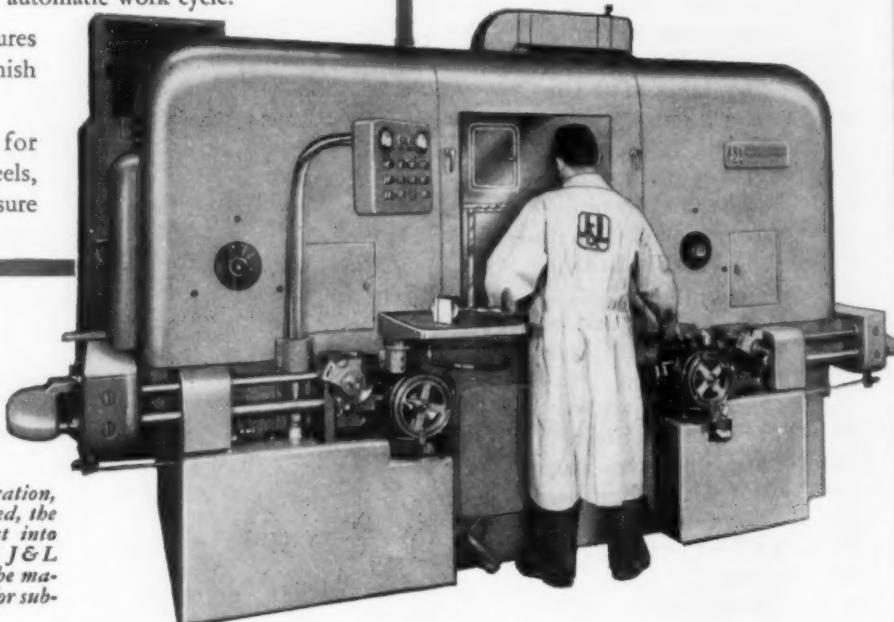
Automatic wheel trueing assures accuracy of form — includes finish trueing before final cut.

Automatic compensation for amount dressed off the wheels, and automatic wheel feed assure accurate sizing.

FEW MORE DIFFICULT GRINDING JOBS EXIST — Yet both sides of the root are ground simultaneously, to gage tolerances, on a production basis.

REPETITIVE ACCURACY MAINTAINED
Spacing of pressure surfaces within .0002
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ACHIEVEMENT RESULT OF SEVERAL YEARS' RESEARCH AND EXPERIMENTATION — This application of the proven principles, long incorporated in J & L Thread Grinders, was initiated several years ago. The first machine was delivered in 1948. Continued study and subsequent refinements have helped lick one of the toughest machining problems of our day. Perhaps we can help you too.



P.S. → Before the grinding operation, the foil contour is checked, the blade oriented and cast into a matrix, on a special J & L Optical Comparator. The matrix serves as a fixture for subsequent operations.

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Machine Tool High Spots

May Ease Up On Tax Pressure Valve

Government may shorten equipment amortization period soon . . . Among Treasury Dept.'s top tax considerations . . . NMTBA proposes "optional depreciation" system—By E. C. Beaudet.

High prices of machine tools both in England and the U.S. were criticized in a recent report by a British productivity team (*THE IRON AGE*, Feb. 5, 1953, p. 102). This attack seems unjustified, at least with regard to the U. S. machine tool manufacturing industry.

The report states that high tool prices limit sales and accentuate the industry's feast-famine cycles. Used to back up this belief is the large number of obsolete tools being used in American plants, which the productivity team says is proof that high prices have killed a potential replacement market.

Policies Are Faulty . . . This reasoning is extremely limited in scope. Faulty government policies in taxation and depreciation have had a much more harmful effect.

In addition, more than a decade's production has been crammed into a few short years, and after the war the government flooded the market with reserve tools at extremely low prices. All these events upset the machine tool market.

Relief Is Coming . . . Easing of tax depreciation policies is regarded by many as the most effective method of increasing machine tool sales and modernizing the nation's industrial plants. And the new Administration has given definite signs that relief is in sight.

National Machine Tool Builders' Assn. recently filed a brief with the Joint Committee on Internal Revenue Taxation suggesting proposals for improving present tax and depreciation laws.

The association recommends that a system of "optional depreciation" replace the present practice of de-

preciating equipment over its theoretical life expectancy.

Could Write-off Faster . . . Under this system a manufacturer could write-off all or part of the cost of equipment in the year it was purchased or placed in operation. If part of the cost was not written off in one year, it could be paid in following years.

It appears the government is more than just considering this line of thinking. Previous administrations failed to revise the amortization schedule because they feared a loss of revenue. They refused to concede the industry claim that more, not less, revenue would result over the long haul of an abbreviated amortization schedule.

Is First Consideration . . . But since the Eisenhower Administration took over, Treasury Dept. officials have placed the depreciation problem at the top of their list of tax conditions that need to be remedied in the immediate future.

Engineers are working side-by-side with revenue experts at the Treasury, in efforts to come up with a workable solution. One high Treasury official says: "We are definitely thinking that some machines should be amortized in 10 years, some in 12, and possibly some in 15 years, instead of the general 20 year rule."

Won't Be Retroactive . . . The forthcoming new rates, however, would apply only to machinery and equipment bought after the new rates became effective. At present, there is no intention of making any of the new rates retroactive to cover machinery purchased prior to the effective date.

Problem won't come before Congress for at least several more weeks. Treasury's recommendations will carry much weight on Capitol Hill, but such specific points as the effective date for the new rates may be threshed out in congressional committee sessions.

Change Profit Tax . . . NMTBA, in its report to the Treasury, has also suggested that income from abnormally high equipment sales made during brief periods not be entirely subject to the excess profits tax. If this suggestion were put into effect, industry would have more capital and be in a better position to ride out lean years.

Another proposal calls for 100 per cent certification of facilities expanded to meet defense needs. It is further recommended that amortization periods for these facilities be shortened from the present 5-year period, in the event that the equipment is no longer needed as part of the defense effort or that the national emergency is declared to have officially ended.

These proposals would enable manufacturers to recover the cost of emergency facilities during the period in which they were producing income.



New Way to

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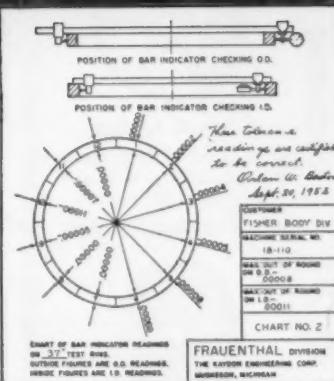
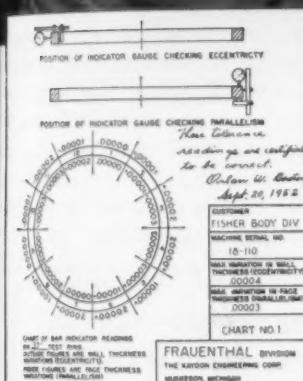
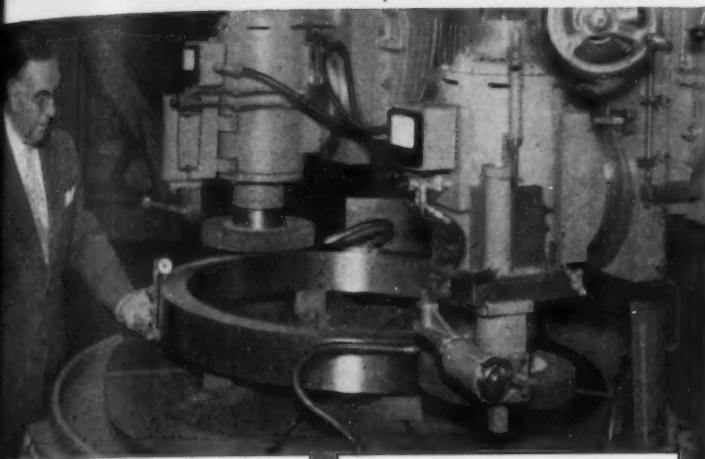
Sling Length	Diameter of each of the 8-parts	Number of Attachments	Type of Thimble	Per cent Savings
10 ft.	5/16 inch	2 full thimbles	Pin-Lock	33.0%
10 ft.	1/2 inch	2 full thimbles	Pin-Lock	23.6%
20 ft.	1/2 inch	1 full, 1 half thimble	Pin-Lock	17.2%
8 ft.	3/8 inch	2 full thimbles	Pin-Lock	22.3%
5 ft.	1/4 inch	1 full, 1 half thimble	Pin-Lock	15.5%
8 ft.	3/8 inch	1 full, 1 half thimble	Pin-Lock	13.0%
10 ft.	5/8 inch	1 full, 1 half thimble	Pin-Lock	8.5%

Leschen now offers a complete line of Red-Strand 8-Part Braided Slings, in addition to Flat-Laced, Grommet, and Single-Part Slings.

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PRECISION GAUGE READINGS • CHART NO. 1

MAX. VAR. IN FACE THICKNESS (Parallelism)			MAX. VAR. IN WALL THICKNESS (Eccentricity)				
Station	Reading	Station	Station	Reading	Station		
1	.000000"	7	.000000"	1	.000000"	7	+.000020"
2	+.000010"	8	+.000020"	2	+.000010"	8	+.000010"
3	+.000030"	9	+.000030"	3	+.000020"	9	-.000000"
4	+.000030"	10	+.000030"	4	+.000020"	10	-.000010"
5	+.000030"	11	+.000030"	5	+.000010"	11	-.000020"
6	+.000010"	12	+.000020"	6	+.000020"	12	-.000010"

Maximum Variation in Parallelism: .000030" Maximum Variation in Eccentricity: .000040"

PRECISION GAUGE READINGS • CHART NO. 2

MAX. OUT-OF-ROUND ON O. D.			MAX. OUT-OF-ROUND ON I. D.				
Station	Reading	Station	Reading	Station	Reading		
1	.000000"	4	-.000050"	7	.000000"	10	-.000110"
2	-.000020"	5	-.000080"	8	.000000"	11	-.000070"
3	-.000040"	6	.000000"	9	-.000050"	12	.000000"

Maximum Variation, Outside Diam: .000080" Maximum Variation, Inside Diam: .000110"

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—Free Publications—

Continued

Chain chart

Engineers of McKay Co.'s Chain Div. have recently completed a new chart designed to make sling chain selection easier, simpler and safer. The chart identifies various types of sling chains and the different attachments which may be used—single, double, triple and multi-slings for lifting any given load. Back of the chart contains tips on how to use and care for sling chains. *McKay Co.*

For free copy circle No. 14 on postcard, p. 10

Press brakes

Bath press brakes are said to have higher speeds, longer ram stroke and greater bed areas. These units have a 30 in. wide press bed comparable to presses of approximate 1000-ton capacity. It is reported possible to do blanking, piercing, shallow drawing, bending, trimming and punching operations at standard production speeds ranging from 45 to 60 strokes per minute. More information is contained in new leaflet. *Cyril Bath Co.*

For free copy circle No. 15 on postcard, p. 10

Torches

Arcair Torches use only a carbon arc and compressed air to gouge and cut metals. Typical applications for these units are to remove pads and gouging defects in stainless and alloy steel castings and to cut out corroded sections in pressure vessels and back gouging welds. More data are contained in a new folder which includes maintenance applications. *Arcair Co.*

For free copy circle No. 16 on postcard, p. 10

Hydrogen peroxide

Purification of Metal Salt Solutions with Hydrogen Peroxide gives complete directions on how to isolate metal salts from process solutions. Among the uses of this process is purification of electrolytic nickel plating solutions with hydrogen peroxide. Other applications are to isolate metal salts in beryllium production, magnesium production, phosphatizing, and tin recovery from nonferrous scrap. *Buffalo Electro-Chemical Co.*

For free copy circle No. 17 on postcard, p. 10



WHY NOT HAVE THE FIGURES?

← Front Side of Tooling Area
Rear Side of Tooling Area →



If you have a tough forming job in mind for a new "automatic," it's more satisfactory to know the recommended maximum load of the proposed machine's cross slides than to merely be told that they are *rugged*.

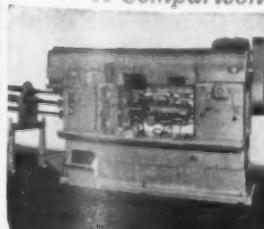
Before a machine can satisfy an important requirement it must be *built that way*. And built to figures instead of adjectives.

There are many factors involved in the building of any brand of Multiple Spindle Bar Automatic, factors on which you may want the figures. You may have the figures on CONOMATICS.



In producing the alloy steel part shown, the maximum load recommendation for each main cross slide of the 3½-SIX is 8,000 foot pounds. The total net weight of the main cross slides is 825 pounds.

A Comparison of ALL Automatics
is in Favor of Cone

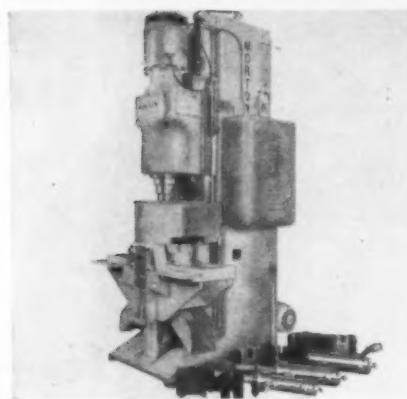


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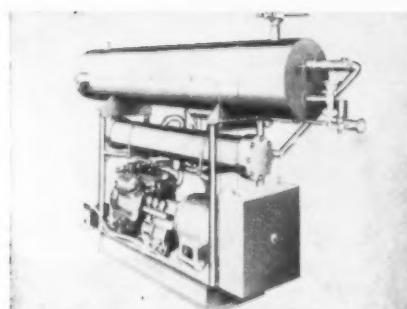


Boring-finishing machine for car journal brasses

This vertical boring and finishing machine performs both the rough boring operation before babbetting and the finish boring operation after babbetting of A.A.R. car journal brasses. The saddle is fitted with suitable bearing plates and gibs to provide for accurate guiding on the hardened ways of the column. Special heavy duty boring spindle operates in anti-friction

bearings. An ac 15 hp 900 rpm vertical motor drives the spindle through the gear box. Sliding reduction gears are provided for adjusting the spindle speeds. Cutter heads for rough boring are of special design with a special cutter head for each diameter of journal bearing. Machine is semi-automatic in operation. *Morton Mfg. Co.*

For more data circle No. 18 on postcard, p. 89

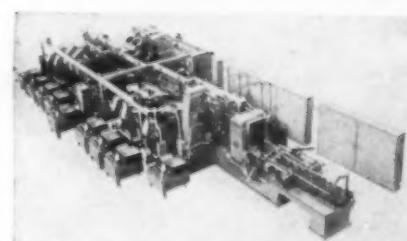


Cold generator lowers air conditioning costs

A packaged water chiller, the cold generator, provides a single-unit source of large quantities of cold water for air conditioning and refrigeration systems requiring between 10 and 50 tons of cooling. This self-contained unit requires only simple water and electrical connections and eliminates complex

installation and maintenance problems. Installation savings are accomplished by combining compressor, condenser, liquid cooler, controls, motor and accessories in a single factory-assembled and tested unit. The cold generator will be made in six sizes. *Trane Co.*

For more data circle No. 19 on postcard, p. 89



Giant machine completes 55 operations

A new Natco Holeway machine is capable of completing 55 operations on engine blocks at the rate of nearly two parts per min. Operations include milling, drilling, combination core drilling and chamfering, reaming, combination spot fac-

ing and chamfering, combination rough counterboring and spot facing, rotating part, vibrating for chip removal and inspecting holes. 19 stations require one operator. *National Automatic Tool Co.*

For more data circle No. 20 on postcard, p. 89



Roller platform simplifies handling steel sheets

Designed to handle unwieldy boxes of stainless steel or aluminum sheet from truck to storage or vice versa, a four-way roller platform for the Master JackStacker allows one man to complete the entire operation. Hydraulically actuated from either the control handle or a button on the carriage frame, the roller platform engages the packaged steel in the vertical position

by means of a steel plate and rotates it to the horizontal position for transporting and racking. The attachment is removable and conventional forks can be substituted in its place. It handles 1200-1500-lb loads; is 84 x 54 in. x 6 to 14 in. thick. Any large bulky load can be handled. *Lewis-Shepard.*

For more data circle No. 21 on postcard, p. 89

Turn Page

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When you place an order for alloy steel plates with Claymont you get the benefit of close-knit, coordinated teamwork that assures painstaking supervision on every order, large or small.

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New Equipment

Continued



Machine forms and bends heated stock

The Series B100 Bulldozer forms and bends heated stock. Its exceptionally rigid bed permits cold forming to the capacity of the machine. Different tools may be set up on top of one another so that successive operations may be done in

the same heat. Upsetting, punching and shearing are possible with a few small changes. The machine is driven by an adjustable friction clutch drive. *British Industries Corp.*

For more data circle No. 22 on postcard, p. H.



Unique gaging device has wide application

The air cartridge unit, a gaging device used in conjunction with Air-O-Limit gages can be used in both single and multiple station fixture-type gages much the same as dial indicators can be used. Practical applications include checking such factors as squareness, height, contour, concentricity, flatness, and depth. Internal and external average diameters can be checked by

using multiple cartridge units in a gaging plug or ring. The unit consists of a plunger with a contact point on one end and a stainless steel ball on the other end operating with axial movement in the cartridge body. Air flow through the cartridge sets up back pressure required to operate the Air-O-Limit gage. *Pratt & Whitney.*

For more data circle No. 23 on postcard, p. H.



Wrapping rolls of paper simplified by new unit

New Portelvator simplifies the wrapping of rolls of paper for shipment or storage. Table area of the unit measures 60 x 72 in.; the lift is 21½ in. and the load capacity is 6000 lb. It is pushbutton operated, enclosed on all four sides, and features a cam operated tilt top with a 3 in. movement. Rolls of paper are delivered onto two rollers at the

edge of the platform where wrapping paper is applied to the rolls' circumference. Rolls are then pushed onto Portelvator and lowered to the floor, where the automatic tilt top operates to discharge the paper onto a second work area where end wrappers are applied. *Hamilton Tool Co.*

For more data circle No. 24 on postcard, p. H.

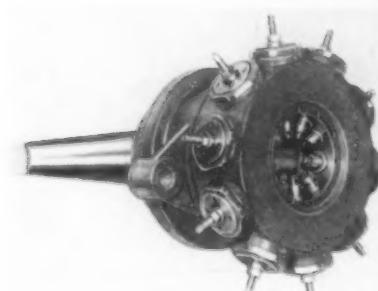


Dual-purpose unit cuts diamond grinding costs

A new exhaust machine, the Vap-Air Exhaust, supplies an accurately controlled flow of coolant to the center of a grinding wheel, assuring even distribution of coolant on the wheel. Excess coolant from the wheel is sucked into a hood which is easily adjusted to the right position for all grinding machine set-

ups. This permits collecting the maximum amount of valuable diamond dust for reclaiming and selling. A spray keeps exhaust hose and fan clean and a collector pan holds the sludge from which the diamond dust is reclaimed. *Shelboerg Mfg. Co.*

For more data circle No. 25 on postcard, p. H.



Machine mills multiple splines, slots, grooves

A cost-cutting method of milling multiple splines or flutes (straight or spiral) in an ordinary drill press or engine lathe is possible on a production basis with a new milling head. Various types or shapes of splines or grooves are milled by changing the cutting tools, which may be adjusted to an accurate

micrometer setting from the outside while tool is in operation. The machine can be operated as a single unit or in series of 2, 4, or 6 heads. Head will operate forward or reverse, longitudinal or vertical or at any angle or degree in between. *Earle G. Boyer.*

For more data circle No. 26 on postcard, p. H.

Turn to Page 100

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Designers and manufacturers of aircraft and component parts can choose B&W Seamless and Welded Steel Tubing with assurance of getting the properties and characteristics required in their finished products . . . and the best combination for utmost ease and economy of fabrication. Critical requirements of high structural strength-to-weight ratio; high and low temperature strength; and resistance to corrosion, stress, fatigue, wear, and shock are all met by B&W Tubing in strict conformity to aircraft standards. Consistently uniform properties and workability are "built" into every foot of B&W Tubing because it is made by closely-controlled precision methods that hold quality to the high standards needed by the industry. Be sure Mr. Tubes —your B&W Tube Representative—is on your list to consult on *all* problems involving the wide variety of tubing in the accompanying column.

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Stainless Steels—*austenitic and ferritic types*,
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As rolled, as drawn, as welded, flash removed, turned, scale-free, and polished

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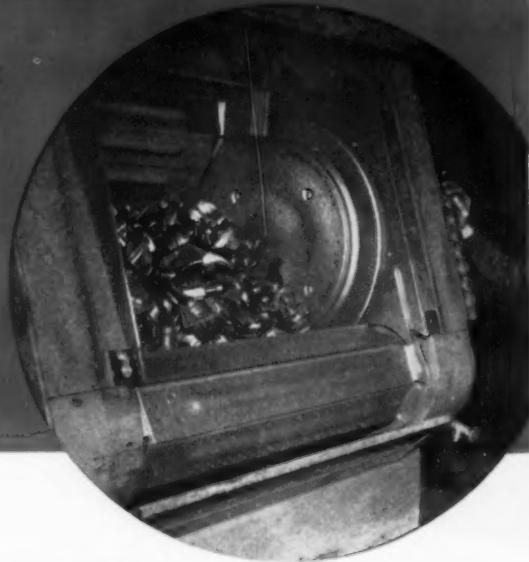
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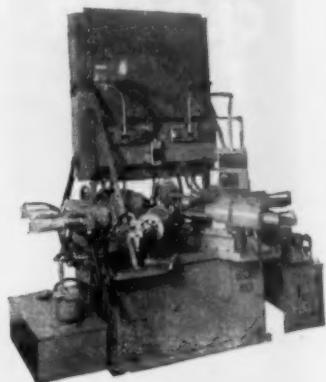
At Haun Drop Forge Co., Ltd. installation of a Wheelabrator Tumblast replaced a number of tumbling mills for cleaning drop forgings. Because Wheelabrating is so much faster cleaning time was slashed 75%. It also provides a better-cleaned surface and improved finish which speeded up all operations which follow cleaning.

Trimming time is reduced 25% and piercing operations simplified due to the thorough removal of all scale. Whereas it had been necessary to clean the pressure plate used in trimming thin section forgings — requiring 30 minutes time every two hours — this costly time-consuming task has been eliminated.

Let Wheelabrator engineers show you how to conserve manpower and reduce costs in your cleaning and finishing department. There's no obligation, of course. Send today for details.

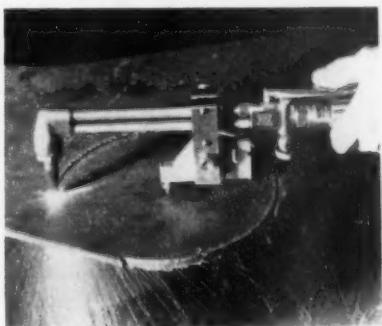


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New Equipment*Continued***3840 holes per hour**

Drilling 32 holes of 3/16 in. diam in a steel part at the rate of approximately 120 pieces per hr is accomplished by a new machine which incorporates 8 Model HH automatic drilling units, electrically interlocked with automatic, hydraulically operated clamping and indexing. In operation, the operator places the part on a fixture and presses the start-cycle switch. The part is automatically clamped and 8 holes are drilled simultaneously at each of the four indexes, thus completing the 32 holes. Then the part is automatically unclamped. Govro-Nelson Co.

For more data circle No. 27 on postcard, p. 89.

**Cutting guides**

New, precision type cutting guides for individual gas flame metal cutting torches, provide workmen with simple, lowcost attachments that enable him to do accurate cutting of circles, straight lines, bevels, and sundry-shapes, with no special training or skill. Styles fit all makes of torches. Torch and lightweight guide are compact and completely portable. New Era Engineering Co.

For more data circle No. 28 on postcard, p. 89.

Turn Page

This 85" hollow-section ring is produced by The French Oil Mill Machinery Company, Piqua, Ohio. It weighs 6500 lbs. and meets tensile strength requirements of 40,000 lbs.

FOR HOLLOW-SECTION CASTINGS...

CHATEAUGAY TOPS THEM ALL!

Consider, for example, this giant ring—a component of the desolventizer toaster used in processing soya beans into cattle feed. Hollow passages between the $\frac{3}{4}$ " thick dual wall sections form a pressurized steam chamber. Because of this, each finished casting must undergo a 300 psi water pressure test before passing code inspection.

Here are the reasons why CHATEAUGAY, Republic's *exclusive* premium pig iron, is used in this application:

1. CHATEAUGAY is an exceptionally fluid iron . . . cools evenly . . . fills adjoining light and heavy sections completely.

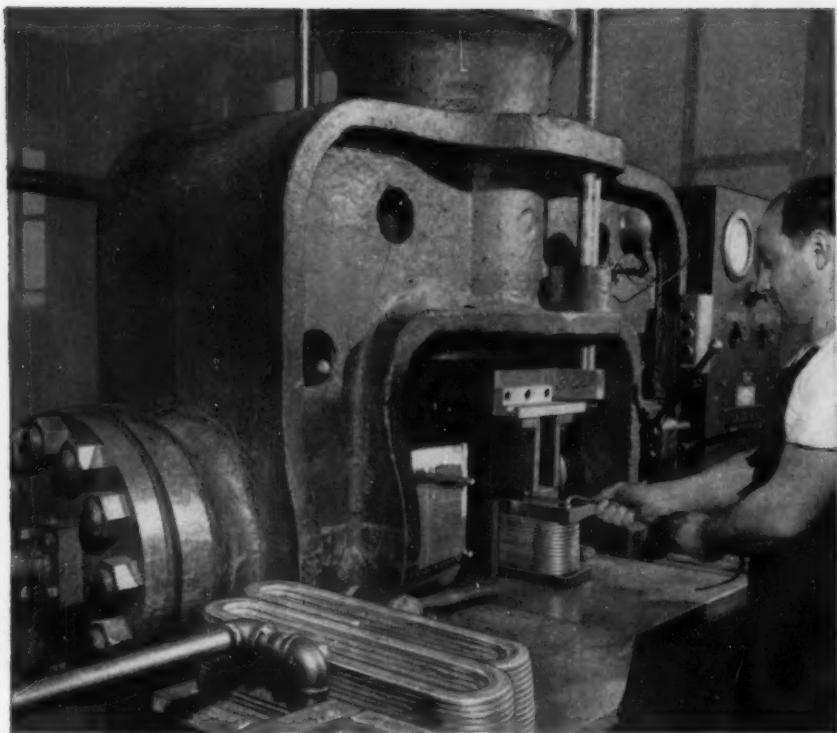
2. CHATEAUGAY shrinks evenly throughout every casting . . . produces an unusually fine and uniform grain structure.

3. CHATEAUGAY castings machine readily.

Whether or not you use CHATEAUGAY Pig Iron, a Republic Pig Iron Metallurgist will be glad to help you get top production from your present facilities. Just let us know when you would like to see him.

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How this 2-way

FARQUHAR Hydraulic Press

forms motor and generator coils

In producing motor and generator coils from $\frac{1}{4}$ x 1-in. copper stock, the stock is first bent and the ends laminated, and then pressed to restore them to their original thickness. Then, the coil is put in this Farquhar 2-way Hydraulic Press for "pressing" the form.

The coil is laid on a steel block, a three-part filler mandrel inserted, and a top block applied. The press "snugs" the coil sides at low pressure (40 tons); then the vertical ram snugs the top. The operator kicks the pressure-shift pedal, to double vertical-ram pressure for forming.

Capacities of rams are 100 tons horizontally and 200 tons vertically. Illustration above shows operator withdrawing the coil after forming has been completed.

Farquhar Presses Cut Your Costs

The above installation is just one more

example of Farquhar performance in heavy production! Farquhar Presses are built-for-the-job . . . assure faster production due to rapid advance and return of the ram . . . greater accuracy because of the extra guides on the moving platen . . . easy, smooth operation with finger-tip controls . . . longer life due to positive control of speed and pressure on the die . . . long, dependable service with minimum maintenance cost!

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New Equipment

Continued

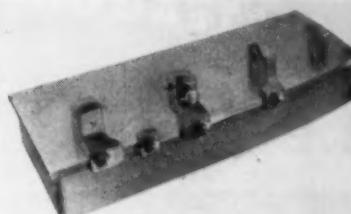
Better castings

Production of truer, cleaner, more economical castings are claimed for a new resin which eliminates clay balls from foundry sand. The material, Lustrex 886, improves sand workability, flowability and packability. This permits uniform packing which eliminates most of the cracks, fissures and soft spots characterizing untreated sands. Smoother surfaces, truer castings and sharp reduction in costly clean-up time result. *Plastics Div., Monsanto Chemical Co.*

For more data circle No. 29 on postcard, p. 11.

Inspection unit

A new inspection unit incorporates all devices normally required for close checking of precision machine parts. Lower tool investment, savings in floor and bench space and reduced inspection costs are claimed for the unit. The basic unit consists of a surface plate, bench cen-



ters, V blocks, sine plate and indicator attachment. It also has a concentricity attachment to rapidly check relative diameters and bores in round or square parts of variable outside diameters. All devices are automatically aligned. *Swanson Tool & Machine Products, Inc.*

For more data circle No. 30 on postcard, p. 10.

Bronze wear strips

OK wear strips in welded Ampco bronze are available in a large assortment of sizes or made to special order. The bronze is welded to a soft steel base, readily machinable for required drilling, tapping and machining to required thickness. Surfaces are ground to close tolerance, reducing manufacturing and assembly time. *Ohio Knife Co.*

For more data circle No. 31 on postcard, p. 11.

Turn Page



- 1 UNLOAD SAND FROM BOX CARS
- 2 CARRY COAL TO PULVERIZERS
- 3 WINDROW SAND FOR CUTTER
- 4 ADD NEW SAND TO OLD
- 5 REMOVE CUT SAND FROM FLOOR
- 6 DELIVER SAND TO MOLDERS
- 7 DELIVER CORE SAND TO CORE DEPARTMENT
- 8 CHARGE MULLERS
- 9 CARRY NEW SAND TO STORAGE
- 10 CHARGE HOPPERS
- 11 HANDLE ASHES
- 12 CARRY OUT SLAG
- 13 HANDLE SCRAP AND SMALL CASTINGS
- 14 CLEAR DRIVES AND YARD OF SNOW
- 15 HAUL AND PUSH
- 16 DO CRANE WORK
- 17 MISCELLANEOUS HANDLING JOBS

PAYLOADERS at Peoria Malleable PAY OFF 17 WAYS

Peoria Malleable Castings Co. believes in mending the roof *before* it rains. Although operations were profitable, they decided to mechanize more completely to improve their productive capacity and to lower costs. Their first step was to purchase "PAYLOADER" tractor shovels to eliminate hard, manual material handling jobs. Examples of the many benefits "PAYLOADERS" accomplished for them are:

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- (2) cut costs 30% in the night

shift on mold dump and clean up. "PAYLOADERS" deliver all sand to a central muller, deliver all sand to molding stations, deliver 65-70 loads of coal per day from outside stockpile to two pulverizers . . . do many other material-handling and other chores faster and cheaper.

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- 1 Do your machining and assembly time allowances fluctuate out of allowable control limits due to casting variances?
- 2 Could you eliminate costly machine operations if your cast parts were held to mutually accepted tolerance limits?
- 3 Would the elimination of just one machine operation facilitate a greater overall production flow in the line set-up?

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—New Equipment—

Continued



Aircraft dock

New standardized maintenance dock for commercial aircraft is mass-produced for servicing of single, twin and four-engine commercial planes. Flexible design includes sidewall slots for wings and a lean-to structure in the rear for the nose. The dock is a rigid steel frame structure, with siding and roofing made of galvanized steel sheets or other material. Because it is pre-engineered at the plant, the dock can be erected with unusual speed and requires only a small construction crew. *Luria Engineering Co.*

For more data circle No. 32 on postcard, p. 88



Heat resistant goggles

Non-toxic, heat resistant and perspiration proof vinyl binding on side shields, eye binders and bridges has been incorporated in new goggles to be worn on jobs where there is extreme heat. Permanently stitched on eye binders and bridges and heat-sealed on side shields, these vinyl-clad metal goggles can be washed or sterilized as often as necessary. *American Optical Co.*

For more data circle No. 33 on postcard, p. 88

Non-skid floor finish

A 100 pct non-skid plastic floor finish is a colorless liquid to be applied with a mop; forms a semi-gloss, non-glare finish that is said to last three to four times as long as wax. Skid-Not can be applied over varnished or enameled wood, rubber or asphalt, tile, cork, or magnesite floors. *Monroe Co.*

For more data circle No. 34 on postcard, p. 88

The Iron Age

SALUTES

Joseph Becker

"Mr. Coke," his story is the story of the byproduct coke oven in America for almost a half-century.



JOE BECKER and coke—think of one and you think of the other. That's the way it's been with America's steel industry since Joe Becker came to the U. S. from Germany nearly 50 years ago, bringing with him the know-how of building and operating chemical-recovery coke ovens.

Up to that time American coke was produced in beehive ovens. But U. S. steel men had seen chemical-recovery ovens built by Heinrich Koppers operating in Germany and wanted to use the process.

Joe built the first American battery in Joliet, Ill., for Illinois Steel Co., later part of U. S. Steel Corp. He considered the job a temporary one and expected to return to Germany in a few years. But the U. S. was destined to become his adopted country.

Good thing for the U. S. that he decided to stay. Joe Becker not only supervised construction of many batteries, but his alert, inventive mind gave birth to many improvements in design and operation. He holds 97 patents covering improvements, developed ovens that will coke coal formerly considered non-coking. a contribution to development of the steel industry in the West.

Joe Becker retired Dec. 31 as vice-president and general manager of Koppers Co.'s Engineering and Construction Div. But he won't be idle. He couldn't be. He will continue with the company as a consultant, will probably never retire in actual fact.



**"John, this building of mine holds a
cost-cutting *Tip-Off*
from ONE BUSINESSMAN TO ANOTHER"**

"What is it?" asked John, a prominent appliance manufacturer.

The contractor answered, "Simply this: don't take your fasteners for granted!"

"An RB&W man showed me how a switch in fasteners could help me make field connections much more economically.

"He suggested switching from rivets to high strength bolts. They cost more than rivets initially, but the assembled cost is much lower. My men work faster than with rivets. The building goes up faster."

You, too, can find a cost-cutting lesson from this story, whether you're in construction* or any other industry.

MORAL: Look to your fasteners for an often overlooked opportunity to reduce costs, and strengthen your competitive position. New in-

ventions, like RB&W's SPIN-LOCK Screw, may prove more efficient than the fasteners you're now using. Or you may save by the stepped-up production you get from using the finest fasteners . . . RB&W bolts, screws, nuts and rivets of uniform accuracy, dependability and physical properties.

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RB&W—The Complete Quality line. Plants: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices: Philadelphia, Pittsburgh, Detroit, Chicago, Dallas, Oakland. Sales agents: Portland, Seattle. Distributors from coast to coast. RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

*If you're interested in construction, write RB&W at Port Chester for a free reprint of the recent article, "No More Riveting."

RB&W 108 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

The Iron Age

INTRODUCES

Wilbur C. Stauble, elected president and chief executive officer, THE OLO-KROME SCREW CORP.

S. S. Goodwin, elected a vice-president, THE NEW JERSEY ZINC CO.

L. A. Williams, appointed vice-president in charge of production, DAY ELECTRIC CO., Detroit; John Weaver, appointed assistant secretary and treasurer; Earl W. Henry, named supervisor of Material and purchases; and Hugo Kummer, becomes plant superintendent.

David C. Walker, appointed vice-president, FEDERAL STEEL WAREHOUSE CORP., Dayton, Ohio.

S. D. Moxley, elected executive vice-president, AMERICAN CAST IRON PIPE CO., Birmingham.

Paul E. Kelly, treasurer also named vice-president, SUPERIOR TUBE CO., Norristown, Pa.

Odin A. Sundness, elected a vice-president in charge of mining operations, in Minnesota, SNYDER MINING CO.

Richard J. Kelly, appointed vice-president, ASHLAND IRON & STEEL CO., Chicago.

William C. Robinson, named director of industrial relations and a member of the Management Committee, LUKENS STEEL CO.

Robert McNeal Smith, named assistant vice-president-sales, Eastern Area, PITTSBURGH SCREW & BOLT CORP.; and Samuel M. Sipe, appointed manager of sales, New York District.

H. M. Williams, named equipment engineer, Metals Div., OLIN INDUSTRIES, INC., East Alton, Ill.; and E. W. Ruhe, appointed mechanical projects engineer.

Ray E. Greiner, becomes director of purchases, SPEER CARBON CO., Saint Marys, Pa.

Leonard P. Mellgren, made district sales engineer, Minneapolis, DE LAVAL STEAM TURBINE CO.

James W. Birkenstock, promoted to director of product planning and market analysis, INTERNATIONAL BUSINESS MACHINES CORP.

Thorsten B. Pearson, named administrative assistant, HYSTER CO., Portland; and Wilton G. Smith, becomes head of industrial truck promotional activities.

James M. Dehn, appointed to engineering staff, PETER A. FRASSE & CO., INC., New York.

Ross Saylor, appointed sales associate, COLUMBIA STEEL & SHAFTING CO., Pittsburgh.

Norman W. Oberg, appointed die sales engineer, KENNAMETAL INC., Latrobe, Pa.

C. N. Murray, named acting general superintendent, DOMINION IRON & STEEL LTD., Sydney, Nova Scotia; and M. R. Campbell, made assistant general superintendent.

Chester E. Grigsby, becomes a member of board of directors, GENERAL STEEL CASTINGS CORP., Granite City, Ill.

Wendall S. Walker, appointed engineering office manager, ENGINEERING & RESEARCH CORP., Riverdale, Md.

G. O. Loach, appointed assistant manager, Welland plant, ELECTRO METALLURGICAL CO. OF CANADA LTD., Toronto.

Gilbert C. Gettelman, appointed to newly created position of design sales engineer, GEUDER, PAESCHKE & FREY CO., Milwaukee.



ALEXANDER B. FREEMAN, appointed vice-president, The American Brass Co., American Metal Hose Branch, Waterbury, Conn.



ANDREW M. TOFT, elected vice-president in charge of manufacturing and engineering, National Can Corp.



DR. ARTHUR A. BROWN, appointed vice-president, Bowser Technical Refrigeration of Terryville, Conn.

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Los Angeles, New York, Philadelphia,
Portland, San Francisco, Bridgeport, Conn.

Personnel

Continued

James S. Walker, named manager of technical service, HOOKER ELECTROCHEMICAL CO., Niagara Falls, N. Y.

Joe Horton, appointed superintendent No. 3 plant, PASTHUSHIN AVIATION CORP., Los Angeles; and **Herb Trautmann**, becomes research and development engineer.

Dean L. Elliott, becomes works manager, THE DUCHESS CO., Alliance, Ohio plant.

Howard C. Williams, promoted to general sales manager, CONTINENTAL STEEL CORP., Kokomo, Ind.; and **F. A. Lewis**, advanced to sales manager, Merchant Trade Div.

W. H. Burkey, appointed district manager, St. Louis, Industrial Div., GOULD-NATIONAL BATTERIES, INC.

J. B. Ellor, appointed sales promotion manager, LAMSON CORP., Syracuse.

Eugene Bigner, becomes controller, Radio & Television Div., SYLVANIA ELECTRIC PRODUCTS INC.

William S. Hemsley, named Chicago district manager, SIMONDS ABRA-SIVE CO., and **A. F. Bodine**, appointed sales representative, Indiana territory.

S. L. Jackson, appointed district manager, Los Angeles office, ELECTRO METALLURGICAL CO., a division of Union Carbide and Carbon Corp.; and **R. L. Reed**, made district manager, Detroit office.

Huntington Eldridge, made assistant distribution sales manager, Almetite Div., STEWART-WARNER CORP., Chicago; **H. J. Howerth**, made head of farm market sales development; and **G. W. Mullin**, becomes a national accounts representative.

Anthony Maladra, named assistant sales manager, KSM PRODUCTS, INC., Merchantville, N. J.

W. A. Mattie, appointed assistant general manager, Heater Div., EATON MFG. CO., Cleveland.

S. R. Rushworth, promoted to purchasing agent, THE OLIVER CORP., Cleveland.



CHARLES D. REESE, elected director of finance, Builders Structural Steel Corp., Cleveland.



NELSON C. GEORGE, appointed assistant chief metallurgist, Gary Sheet & Tin Mill, U. S. Steel Corp.



LEO J. ROHRER, appointed manager, Order & Scheduling Dept., Crucible Steel Co. of America, Pittsburgh.



BENNETT BURGOON, JR., appointed sales manager, Metal-Working Div., Kennametal Inc., Latrobe, Pa.

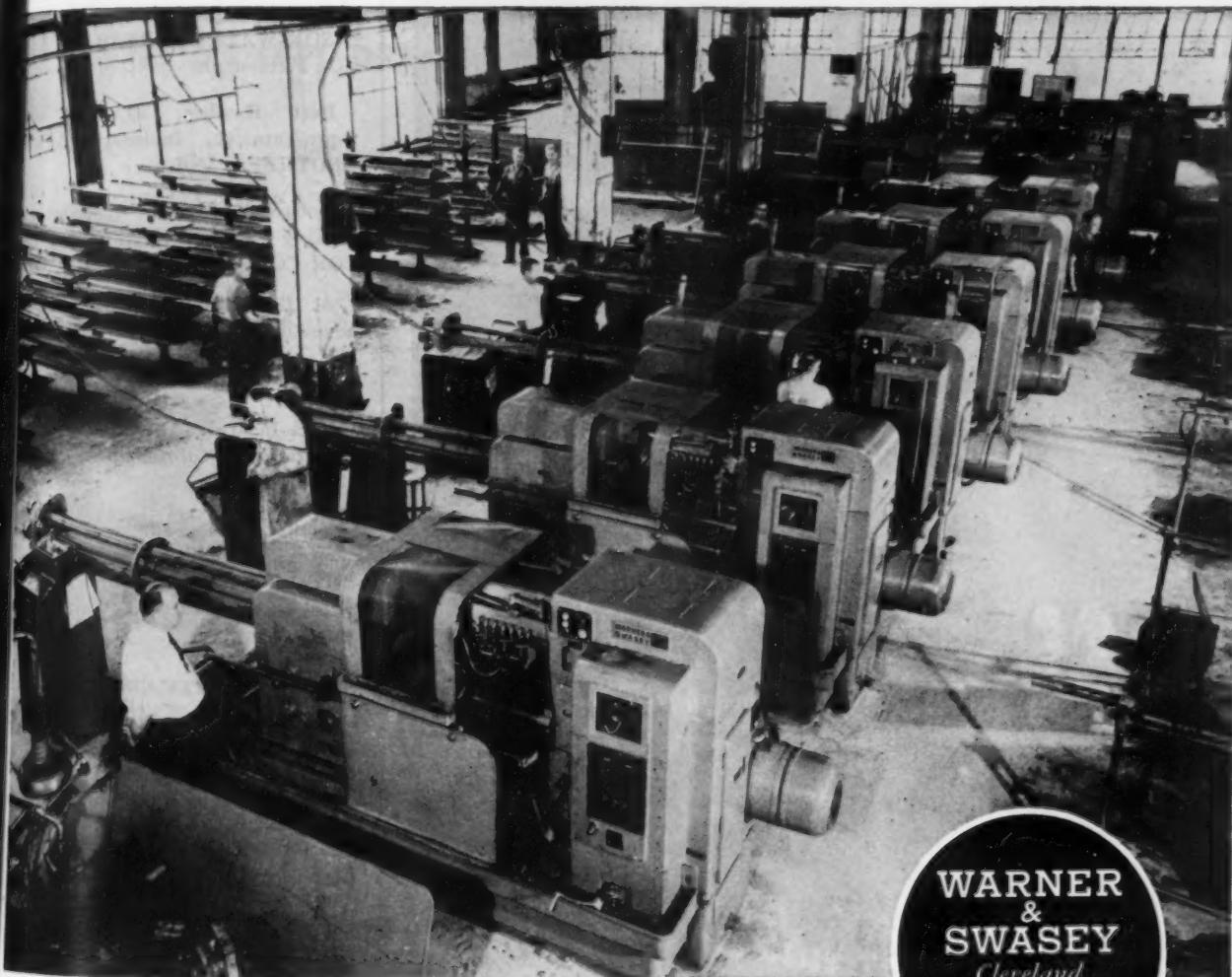
Modernization pays off!

6 MACHINES NOW DO
THE WORK OF 17

● As part of their modernization program, Otis Elevator Company replaced 17 machines with 6 Warner & Swasey 5-spindle Automatics. These automatics are used at Otis for short runs on specially-machined parts—studs, bolts, nuts and other screw machine products—required for custom-made elevators.

The results of this modernization program: increased production in less floor space, more uniform parts, and six critically needed men released for work elsewhere in the plant. At Otis only 3 men are required to set up and operate these 6 automatics.

Because of its quick setup and ease of operation, the Warner & Swasey 5-spindle Automatic makes automatic production economical on short runs as well as large lots. It's a machine designed to meet the requirements for lasting accuracy and increased production for the years ahead.



The Warner & Swasey 5-Spindle Automatic line at the Yonkers Works of the Otis Elevator Company.

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Personnel

Continued

Edward M. Rhodes, named assistant to general manager, Baldwin-Duckworth Div., CHAIN BELT CO., Milwaukee; **Roland V. Poisson**, appointed assistant sales manager; and **William E. Kennedy, Jr.**, named supervisor of automotive timing sales.

Gordon L. Graham, appointed general supervisor, branch accounting, Electro-Motive Div., GENERAL MOTORS CORP., La Grange, Ill.; and **C. T. Donovan**, named branch representative.

William B. McCausland, appointed to New York district office, as sales representative, MARION POWER SHOVEL CO., Marion, Ohio; and **Edward Staker**, appointed sales representative in the Northwestern Ohio territory.

Max W. Demler, appointed salesman, Minneapolis sales office, HAR-BISON-WALKER REFRactories CO., Pittsburgh.

Bert Hawhee, appointed sales representative, Indiana, WAGNER BROTHERS, INC.

Hobart E. Switzer, appointed purchasing agent, ELECTRIC REGULATOR CORP., Norwalk, Conn.

A. D. Gage, appointed assistant advertising manager, Nash Motors Div., NASH-KELVINATOR CORP., Detroit.

Carl F. Welke, becomes sales representative, Cleveland, GISHOLT MACHINE CO.

Walter H. McCann, appointed supervisor of tubular sales, Eastern Div., THE NATIONAL SUPPLY CO., Pittsburgh. He succeeds Walter Wirth, who has retired.

OBITUARIES

Daniel Gurney, 52, vice-president and director of engineering, Marlin-Rockwell Corp., Jamestown, N. Y.

Charles Arthur Booth, 76, executive vice-president, Buffalo Forge Co., in Buffalo General Hospital after a short illness.

Irving F. Wolfgram, assistant to the executive vice-president, Alan Wood Steel Co., suddenly at his home Wayne, Pa.

Samuel Koffsky, chief engineer, Simmons Machine Tool Corp., suddenly in Albany.

**New vistas
for the smaller shop—**


The Iron Age
FOUNDED 1855
Technical Articles

Short Runs at Low Cost WITH PLASTIC TOOLING

TOYS
HARDWARE
APPLIANCES
TV AND RADIOS
SPECIAL BODIES
EXPERIMENTAL DESIGNS

- ◆ Cast plastic stamping, forming and drawing dies have several advantages over metal for relatively short runs and experimental work.
- ◆ Tooling time is reduced to a matter of days instead of weeks or months . . . Costs are cut sharply.
- ◆ Much machining, barbering and spotting of short run dies is virtually eliminated.
- ◆ Potential applications extend beyond the automotive and aircraft industries to a wide range of products.

◆ STAMPING AND DRAWING dies can be made faster and at less cost in cast plastic where runs of 20,000 to 50,000 pieces are required. Though not intended to replace hard iron on high production work, their success in the aircraft and automotive industries suggests wider application in all industry.

Plastic form dies have been standard in the aircraft industry for 3 years, where they were developed by Lockheed and North American in conjunction with Rezolin, Inc., the manufacturer.

One of these dies, of Rezolin Tool-Plastik, has passed production tests at Chrysler Corp.'s Dodge Truck plant. It has already turned out 20,000 cowl side panels for a current model Dodge truck.

This article compares cost and production factors for automotive use. A second article will consider the advantages of combining hard iron, Kirksite and plastic dies to produce metal stampings.

Principal objective of the test was to determine how many pieces the plastic die would produce. The cowl side panel (largest piece shown in Fig. 1), made from 0.040-in. steel, was chosen because there is a complex draw operation involved. A potential production of 50,000 pieces would permit engineers to determine the ultimate capacity of the die.

To use the existing line of hard dies to complete the formed part, a Tool-Plastik duplication was made of one of the dies. To do this, the punch and binder ring of the metal die were set up in their correct relationship.

A female plaster cast was taken to serve as the pouring mold for the plastic punch. After the punch was cast and cured, the binder ring was made and fitted with the punch in a similar manner to that used in the metal die.

Metal thickness was first applied to the punch and binder ring by the use of pattern makers'



Walter G. Patton, Assistant Technical Editor, has carefully researched this article for its importance to the smaller shop as well as to the mass production plant. It should prove valuable to anyone concerned with pressing, stamping, forming or drawing.—Ed.

wax. The female portion of the die cast directly against the other, with accurate part thickness established between them, resulted in perfect mating and eliminated the Kellering and die barbering which is the biggest item of expense in making metal dies.

To equip the plastic die with base plates, boxings of boiler plate were fabricated to contain the castings, Fig. 3. The base members were made of 1½-in. plate; the walls of 5/8-in. plate were reinforced with gussets of the same thickness. These weldments were then normalized and machined.

Because of the acid action of the Tool-Plastik accelerator additive, the steel boxes were treated with a protective paint. The boxes were then inverted over the mold and the plastic poured through holes in the base plate.

Approximately 3 weeks after work was started, the die was inserted in the press at Chrysler Nine-Mile Press Plant and the first acceptable stamping was produced. After running a few pieces, the wear plates on the punch were cutting plastic off one side of the ring. At about the 25th hit, the plastic between the long side of the die cavity and the draw bead broke away. This ended the first stage of the development.

On investigation it was discovered that the press was out of adjustment which was a contributing factor to the early die failure.

Two other facts were established at this time, both of which were the result of using the old metal die as a reference tool. (1) A 1¼-in. minimum wall of Tool-Plastik should be maintained between the edge of the draw bead and

the die cavity. Unfortunately, the metal die from which the first plaster master was cast had only a ½-in. wall thicknesses. (2) Wear plates should be incorporated on both punch and ring and should extend about ¼ in. beyond the surface of the plastic instead of 1/16 in. as on the original.

Cast iron draw beads in the die and binder ring; bronze wear plates were added on the punch and steel wear plates on the blank holder. With these changes completed, the die was returned to the press and, after a brief spotting-in period, produced excellent stampings.

As soon as the rest of the dies required to complete the cowl are assembled, a production run will be made to determine the life of the die. So far, over 20,000 pcs have come off the die.

An interesting feature of this plastic was demonstrated early in the run. A hidden air pocket in the plastic punch, just under one of the wear plates, caused a piece of plastic to break out. Repairs were made without removing the die from the press and the run was resumed in 1 hr 10 min. The patch was accomplished with the regular Tool-Plastik resin and "Quick-Set" accelerator. Curing time, normally 2 hr, was shortened by the application of heat from an infra-red lamp.

Fig. 2 shows an operator drilling air holes in a punch to be used as a standby die for forming a passenger car hood. This die will be run as long as possible by another car manufacturer to determine its ultimate service life.

The test die established that combination metal and plastic dies can be purchased or built for 50 pct or less of the cost of an all-metal die.

TABLE I
PROPERTIES OF REZOLIN PLASTIC

Shrinkage from mold dimensions in. per in.	Negligible
Hardness, Rb, ½-in. ball	110
Flexural strength, psi	8,000
Modulus of elasticity in flexure	5 to 7 x 10 ⁵
Compressive strength, psi	11,000
Tensile strength, psi	5,000
Impact strength, ft-lb, Izod	24-0.3
Water absorption, pct	0.4
Linear coefficient of expansion, in. per in. per °F.	0.000008.2
Specific gravity	1.26
Dielectric strength, kv per cm	130
Dielectric constant 60 cycle	17.42

TABLE II
CASE HISTORY OF A DRAW DIE

Item—Typical draw die for a panel involving considerable detail	
Size—30 in. x 60 in. x 3 in. deep	
Tooling—in metal: 84 days	
Time—in Rezolin Tool-Plastik: 21 days	
Cost—Rezolin die costs one-half that of metal die	
Weight—Rezolin saved 40 pct in weight over metal die	
Spotting-in—Proving Time—Rezolin die 70 pct less than metal die	
Characteristics Yardstick	
Material cost per cu ft	Zinc Alloy \$58.00
	(18 to 16¢ per lb) (48¢ per lb)
Weight per cu ft	375 lb
Pouring temperature	780 °F and up
Curing time	70 °F
Shrinkage from mold dimensions	Overnight negligible
	Approx. ½ in. per ft

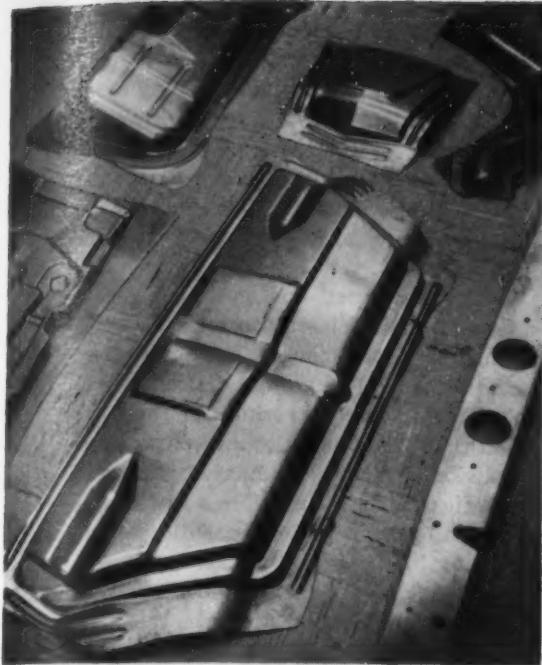


FIG. 1—Shown in the photograph are typical metal stampings made with plastic dies. Inside door panel (left), one-half size experimental hood (rear center), gas tank (rear left), air duct (rear right), instrument panel (right), and cowl side panel for trucks (center).

The experimental die at Chrysler also proved that these plastic dies can be made in a half to a third the time required for metal dies. Weight is another factor; 1500 lb for the plastic die as contrasted with 6000 lb for the conventional steel die.



FIG. 2—Operator drills holes in a steel re-inforced plastic die with three steel inserts. Metal inserts are used at critical locations to increase die life. Holes in the die permit trapped air to escape.

In addition to the truck panel die described there are a number of other more recent automotive applications of plastic dies. Typical examples are shown in Fig. 1. Both the size of the stampings and the difficulty of the drawing operation should be noted. Fig. 4 shows a small

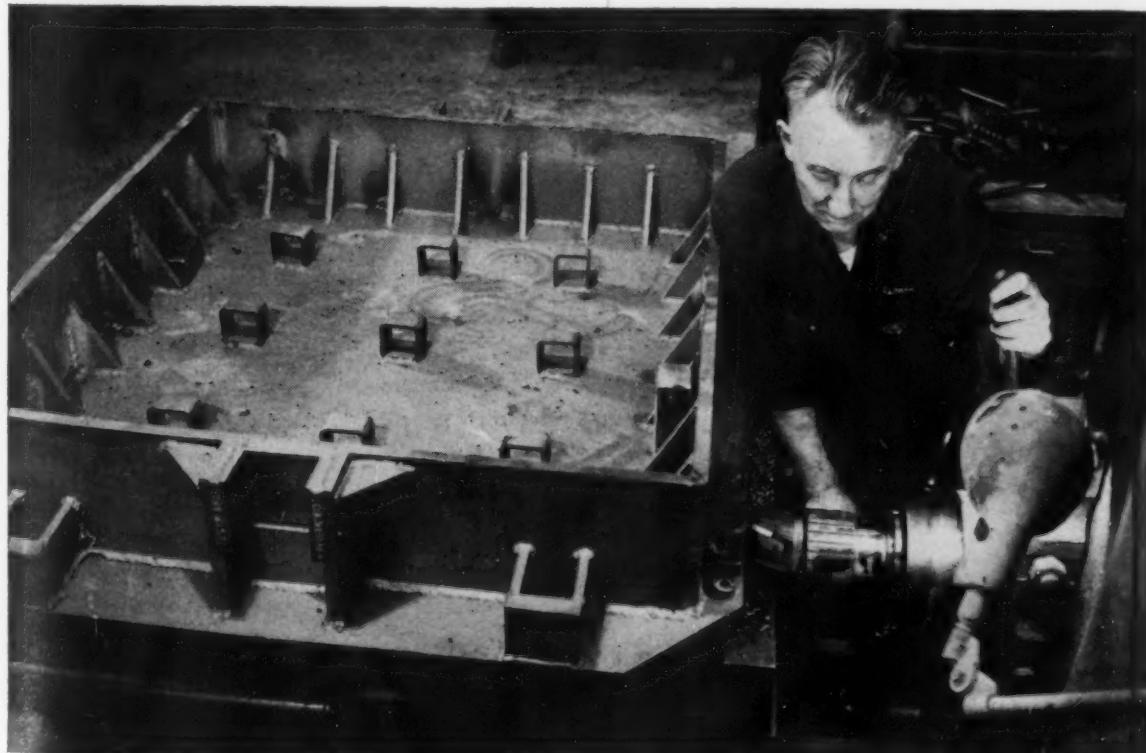


FIG. 3—Typical fabricated metal box used to hold a large plastic die. Walls are welded boiler plate, re-inforced with

gussets of the same plate thickness. Weldments were normalized and machined after fabrication.

**"Patterns, molds are constructed
to standard scale . . . Mold shrink-
age is not a factor . . ."**

ash tray made of stainless steel.

Contrary to the practice of allowing for shrinkage in cast metals, patterns and molds for these plastic dies are constructed to standard scale. Since mold shrinkage is not a factor, close tolerances can be maintained without the necessity of oversize patterns.

Rezolin Tool-Plastik is a thermosetting liquid phenolic plastic, mixed cold and readily poured without pressure, and usually cured by overnight heating at 160°F. Each member of a plastic die can be cast on a single shift and be ready for use in 48 hr under normal conditions.

If the plaster mold is properly prepared, with a parting lacquer and a smoothly sanded surface, the as-cast finish of the tool is ready for production. Machining, grinding and polishing of the casting normally is not necessary. With metal tools, many hours of such work may be required to bring them to required dimensions.

In contrast to the long tooling time for metal dies, Lockheed made 42 plastic double-action dies for its F-94 all-weather fighter air duct in 90 days. The company saved approximately 6000 man-hr over the same tooling in metal dies for the F-80, which is a similar type plane.

In a test at Northrop, seven typical aircraft tools that had been made of metal were cast in Tool-Plastik. Time saving, accruing mostly from the elimination of tool finishing, averaged 47.7 man-hr per tool. The cast-in dimensions and finish were within tolerance requirements. Elapsed time was about 50 pct less than with the metal tools and overall cost savings were better than 60 pct.

With time, cost and accuracy requirements satisfied, these plastic tools were released to production departments. The plastic tools were found to cause less galling of the parts and less distortion from cold-working of the formed material than their metal counterparts. Press time is obviously more productive. Large Rezolin draw dies are "spotted in" in a matter of a single shift while comparable metal dies often have a "spotting in" time of 2 weeks.

Rezolin Tool-Plastik is now available from most major industrial areas in the U. S. It is sold in unit lots of 100 parts of resin to 25 parts of accelerator paste, which can be stored indefinitely and mixed in this same proportion at the time a cast is to be made.

Although the cast plastic can be cured in an oven for 12 to 18 hr, experience has proved that tools too large for available ovens can be cured by the use of infra-red heat lamps. The 160°F temperature is moderate and can be maintained easily by either method. Table I lists the physical properties of the non-shrink plastic. Table II compares the lives of zinc and plastic dies.

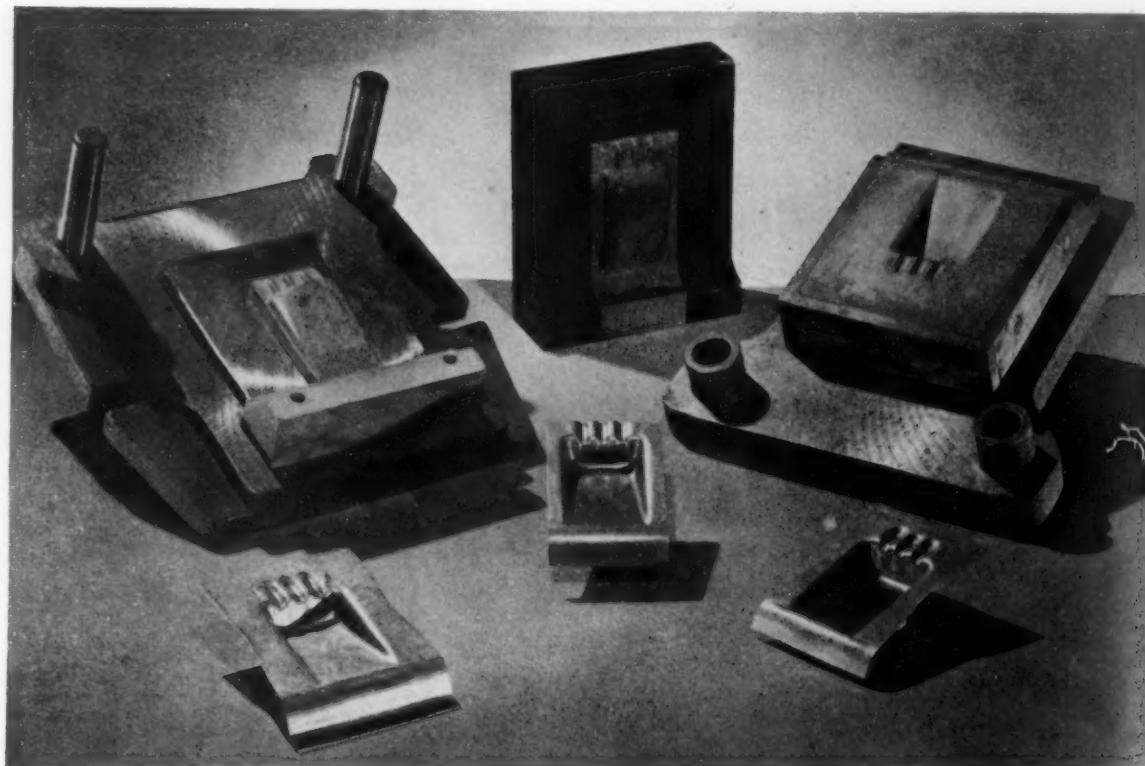


FIG. 4—Rezolin plastic draw die used to produce a small stainless stamping. The finished panel is 4 x 6 in. with a

1-in. draw. These dies were designed and produced by The Modern Pattern Works, Toledo, Ohio.

No cracks now—

HOT SPINNING improves workability of titanium



By Arnold S. Rose

Research and Development Laboratory
I-T-E Circuit Breaker Co.
Philadelphia

- ◆ Localized heating of titanium to within a range of 1000° to 1300°F provides the ductility essential for spinning . . . Without application of heat, titanium parts will break with a brittle fracture during the operation.
- ◆ Oxy-gas flames are normally used for heating, but because the spinning cycle is only of 40-sec duration, oven heating to 1300°F prior to spinning may be used as an alternate method.
- ◆ Protection is afforded to the hardwood spinning chuck by two heat shields—one of steel and the other of aluminum.

◆ Fabrication of single-unit or prototype models can be done economically by spinning because no elaborate forming tools are required. The process has particular importance in development work on jet aircraft engines where cylindrical and conical sections are widely used. The only tooling generally necessary is the turning of a hardwood chuck to suitable outline.

Spinning of titanium deviates from conventional practice in that titanium must be worked at an elevated temperature and the wooden chuck used must be protected from overheating. The optimum temperature for spinning titanium is in the range of 1000° to 1300°F. Heating the chuck to such temperature will cause charring, burning and eventual destruction.

After several trials, a method of protecting the chuck was adopted, Fig. 1. This involves a set of intermediate metal covers which interpose a heat shield between the titanium and the wooden chuck. An outer steel cover provides a hard surface against which pressure of the spinning rolls is applied. It also serves as essential heat insulation.

An inner aluminum cover was included because efforts to spin the 0.140-in. thick titanium cone required longer localized heating than was anticipated. This caused the chuck to char badly and disintegrate in spite of the protective steel cover. A new chuck was prepared and an alu-

minum cover was spun over the chuck in direct contact with the wood. The steel cover was then replaced over the aluminum. High thermal conductivity of the aluminum rapidly diffuses heat from the heated area and thus prevents charring of the chuck. This additional protection enables repeated use of the chuck without failure.

The spun titanium part shown in Fig. 2 is a

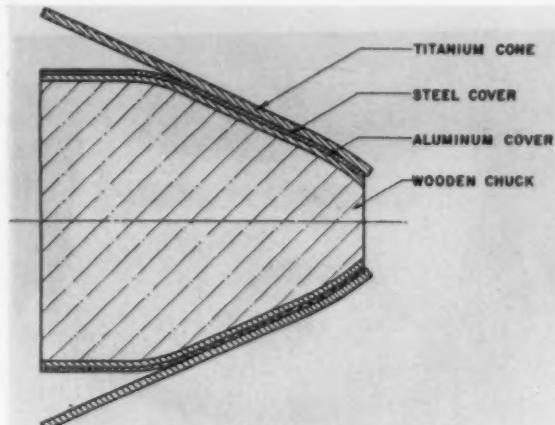


FIG. 1—Two heat shields prevent charring, and eventual destruction, of the wooden chuck when heat in the range of 1000° to 1300°F is applied to the 0.140-in. thick titanium cone. The aluminum and steel shields rapidly dissipate heat from the area being spun.

"To make the titanium sufficiently ductile for spinning, continuous localized heating is necessary . . ."

typical fabrication. A length of 0.140-in. thick RC-70 sheet was rolled into a conical shape and the butting edges joined by inert-gas-shielded tungsten-arc welding. The weld must be of excellent quality, otherwise defects or embrittlement in the weld zone will cause failure during subsequent spinning.

To make the titanium sufficiently ductile for spinning, continuous localized heating is necessary. This is provided by a manifold and a set of oxy-gas burners, Fig. 3. The position of the burner tips can be varied with respect to the chuck by means of hand-wheel gear arrangements. The lateral and vertical adjustment thus permitted enables the spinning tool to follow the flames.

The tendency of titanium to seize and gall during spinning does not allow the use of bronze rod for the spinning tool. After several trials, a hardened steel roller was made and used as the spinning tool. It was mounted on a scissor tool by means of roller bearings to provide greater leverage and enable the operator to apply greater pressure to the workpiece.

The welded titanium cone is placed on the chuck, clamped with an end plate, and rotated in a lathe. The mixed gases are then ignited and the flames positioned over the area to be spun. At about 1200°F, the hardened steel roller is applied to force the titanium cone to conform to the shape of the chuck.

Spinning of thinner sections of titanium is relatively trouble-free. Parts of smaller diameter can also be spun but the pressures exerted on a smaller wooden chuck may possibly cause its failure. Therefore, a steel chuck is used with no other changes in procedure.

Mechanical shear forming of sheet metals



FIG. 2—This typical spun part is made of 0.140-in. thick RC-70 titanium sheet. The part is first rolled to conical shape and the butting edges joined with a high-quality weld to prevent failure during spinning.

differs markedly from conventional manual spinning. This process, used extensively for making metal cones for television tubes, produces a reduced section in the portion being spun, Fig. 4. The cone wall is reduced as a function of the sine of the spinning angle and the finished cone diameter is precisely that of the initial blank. For example, a 16-in. diam blank of 0.100-in. thickness may be spun to a 16-in. diam with an 0.045-in. wall thickness.

Equipment used for mechanical shear forming is shown in Fig. 5. The spinning force is applied hydraulically by steel rollers against the blank mounted on a rotating steel chuck. Materials spun by this process for the production of cones for television tubes include AISI types 446 and 430 as well as low-carbon steels.

An attempt was made to mechanically spin titanium and subject it to an exceedingly severe forming operation. This would serve to establish data for future application. Blanks of 16-in. diam RC-70 titanium were prepared and an initial trial was made at room temperature. Immediately upon application of the spinning rollers, the blank was severed into two pieces, breaking with a brittle fracture.

Subsequent trials showed that hot spinning was necessary. Since spinning time was only about 40-sec duration, heating could be done prior to spinning rather than using flames during spinning. A blank was preheated to 1300°F in an oven, then transferred to the chuck and spun immediately.

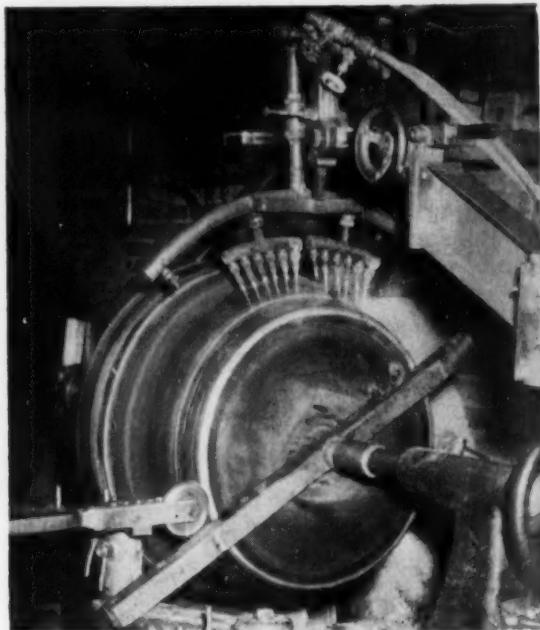


FIG. 3—Continuous localized heating is essential to provide sufficient ductility for spinning. Oxy-gas flames supply the heat. The position of the heating heads can be adjusted laterally and vertically.

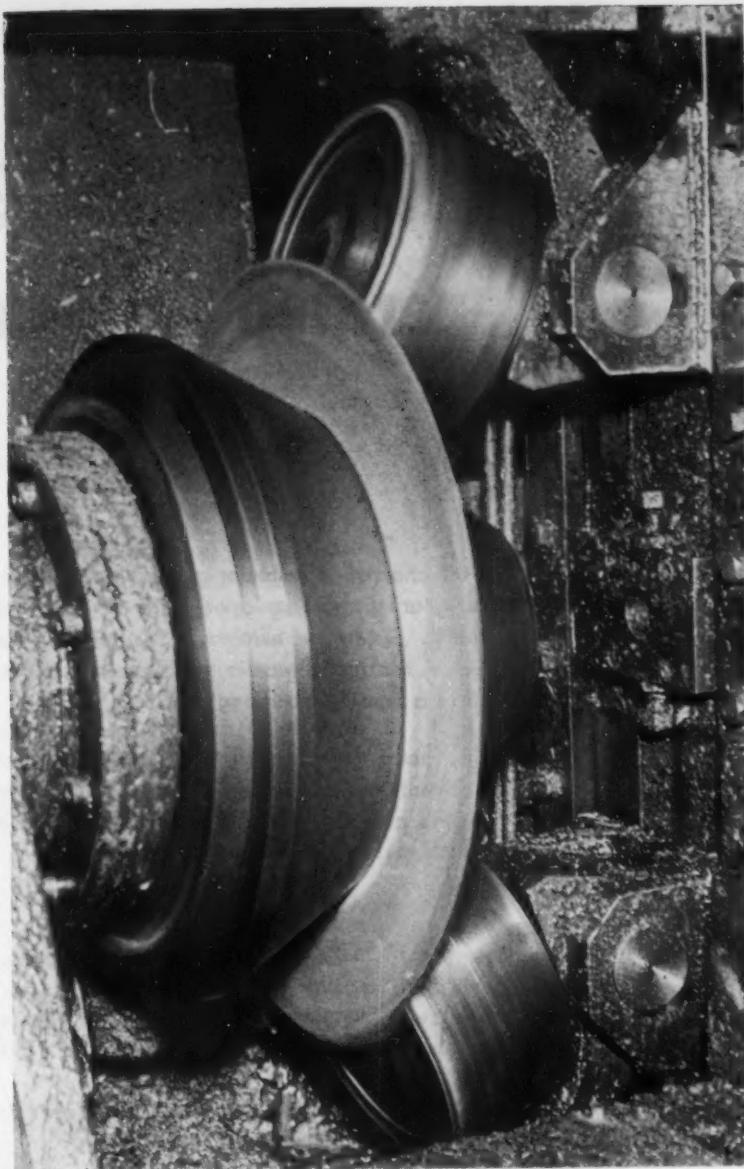
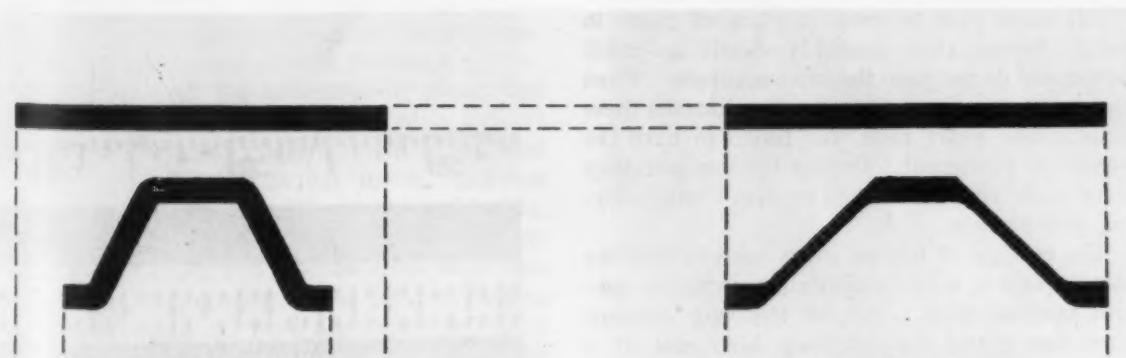


FIG. 5—The spinning force for mechanical shear forming is applied hydraulically. Two steel rollers apply pressure to the cone on the rotating steel chuck.

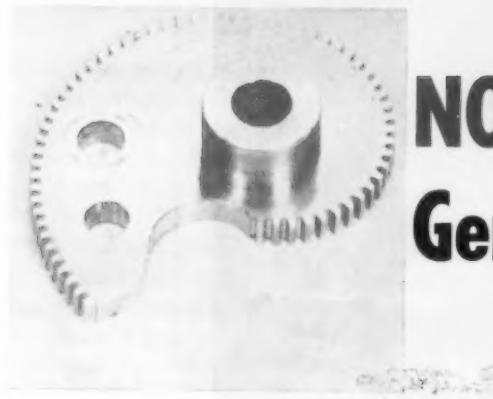


Manual Spinning

FIG. 4—Mechanical shear forming differs from manual spinning in that the spun section is reduced in thickness.

Mechanical Shear-form Spinning

The original diameter remains the same. The equipment used in shear-form spinning is shown above.



NON-CIRCULAR GEARS Generated Automatically



By E. C. Beaudet
Machinery Editor

- ◆ Production of non-circular gears is being done automatically on a gear shaper equipped with standard electrical components . . . Method eliminates the need for copying attachments . . . Making of master gears used in copying attachments requires a considerable length of time.
- ◆ This factor together with the relatively high cost of copying attachments makes such an automatic operation desirable for short and medium runs . . . Rate of output is comparable to standard method.

◆ AUTOMATICALLY CONTROLLED MACHINES is one of the most promising fields for application where a wide variety of parts is required in small production quantities. In such fields as industrial and scientific instruments, a whole year's production of one part has to be made in some cases to justify the cost of tooling, setup time, etc. Short runs, design changes and a falling off of orders sometimes make stocking of these parts uneconomical.

The making of non-circular gears is a case in point. The Arma Corp., Garden City, N. Y., requires a relatively small number of these gears for T 41 range finders used in U. S. Army tanks. While cams may be used in place of gears in range finders they cannot transmit as much power and do not have the same accuracy. When the company sought subcontractors to make these non-circular gears none was found to have the necessary equipment. During the last war they were made on gear cutters equipped with copying attachments.

The making of master gears used in copying attachments is a tool maker's job requiring several months work. Despite the long delivery time factor and the relatively high cost of a copying attachment, Arma found it necessary to have one built and wait out the required time.

Impressed with these difficulties and believing that non-circular gears have many unrealized potentialities in computer mechanisms, Dr. Fred

Cunningham, general engineering consultant at Arma Corp., developed in his home workshop a method of automatically generating non-circular gears on a gear shaper to which various standard

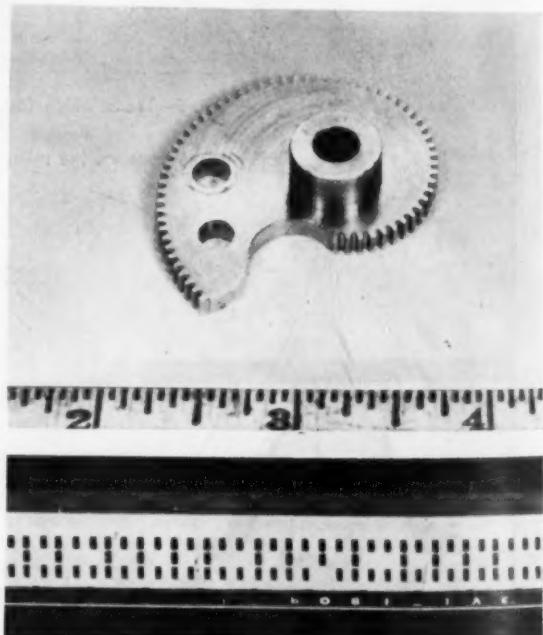


FIG. 1—Non-circular gear shown here is now being generated automatically. It is used in Army T 41 range finder. At bottom of photo is film strip containing a third of the data for the generation of one tooth of the gear.

electrical components had been attached. No master gears are required and long production delays for subsequent non-circular gear designs are eliminated. Dr. Cunningham is now producing these gears on a subcontract basis.

Data is automatically fed into the machine by motion picture film. A photo of one of the non-circular gears made in this manner is shown in Fig. 1.

To obtain data for input into the machine, the required rotation of the cutter and the work as well as the distance between their centers is calculated for as many points along the curve of the gear as necessary. The differences between values are then computed and the best spacing for linear interpolation of the curve is found.

Values put on film

These values are put on motion picture film by photographing the flashes of a row of four lights. A copy of the film containing data for the generation of one gear tooth is shown at bottom of Fig. 1. In the first column each spot represents one Y100 of a tooth rotation of the cutter. The second column spots represent each 0.00025-in. approach of the cutter to the work. Two min of angular rotation of the work is signified for every spot in the third column. A spot in the fourth column stops the machine.

Computing of this data takes in the neighborhood of 100 hr for the gear illustrated in Fig. 1. Putting these values on the film takes about 4 hr. A computing instrument now being developed by Dr. Cunningham will reduce by about three-fourths the time now needed to make these calculations.

Projected to photo-electric cells

Once the necessary data is put on the film it is projected continuously on a row of photo-electric cells. From the photo-electric cells, the signals are carried through amplifier tubes to increase their strength and relays. The relays actuate ratchet mechanisms which rotate synchrotransmitters. The synchrotransmitters then control the angular position of the cutter, the work and the distance between their centers. In this manner the gear is generated from the blank.

Equipment used for automatically generating these non-circular gears consists of a Fellows No. 72 gear shaper equipped with a standard Arma low inertia induction motor, damping generators and servo amplifiers as shown in Fig. 2. The instrument components are attached to the machine in random fashion since they were not designed specifically for the job. A close-up of the cutter and the work are shown in Fig. 3. About three non-circular gears per hr can be produced by this method. This is said to be about equal to the production rate obtained with a gear shaper equipped with a copying attachment. Cutters used are standard 24-tooth, 48-pitch involute cutters. In cutting, the cutter

backs off the full length of the gear teeth to prevent hooking. A tolerance of 0.001 in. is held. Gears can be cut of any material used by a standard gear shaper.

Although short and medium runs seem the most promising for the application of automatically controlled machine tools, the controls attached to this gear shaper would not be used for other types of machine tools.

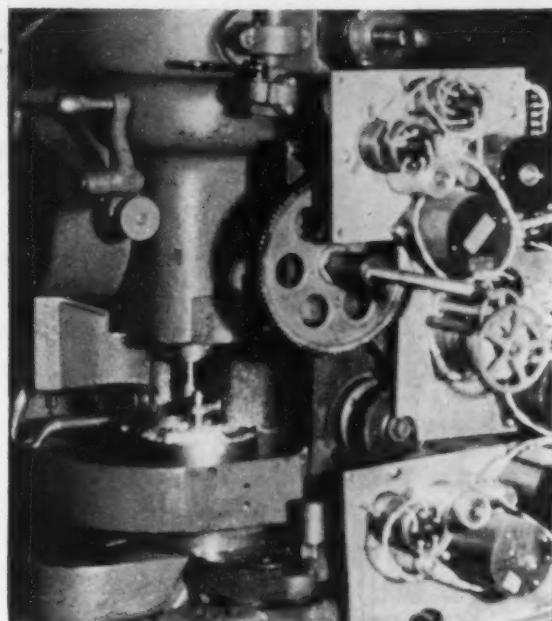


FIG. 2—Electrical components attached to gear shaper for automatic operation include servo mechanisms, damping generators and induction motors shown above.

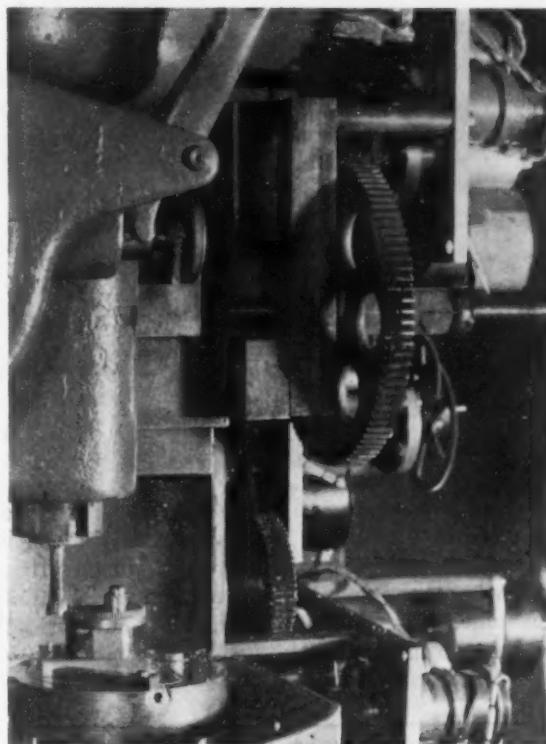


FIG. 3—Close-up view of the machine shows cutter, work and gearing arrangements. Cutter control rotation synchro and cutter control gearing are at lower center.

The heat's on—

Small Parts Hot Headed in Cold

- ◆ Ford's cold heading department produces 1300 different parts on 125 cold headers and 26 boltmakers . . . Additions to standard equipment have speeded many operations, cut hand labor.
- ◆ Production of push rods is 31 per min in a cold-heading machine adapted for hot heading . . . It is believed to be the first such setup.
- ◆ Valve tappets of SAE 5120 cold-drawn steel are made at the rate of 3000 per hr in a boltmaker . . . Only grinding is required for finishing.
- ◆ Use of hot-rolled steel wire for blanks promotes flexibility of operation, decreases damage to slow-moving stock and lengthens tool life.

By H. Chase
Consultant
Forest Hills, N. Y.



◆ COLD HEADING OPERATIONS at Ford's River Rouge plant are widely varied and huge in scope, so much so that the installation is one of the largest to be found anywhere. About 125 cold headers and 26 boltmakers occupy about 100,000 sq ft of floor space. Besides doing the heading, these machines trim the heads, point the ends and roll the threads. In all, about 1300 different parts are produced, half of which are used for current model cars, trucks and tractors.

One unusual job is the making of push rods for six-cylinder valve-in-head engines. The machine used, Fig. 1, was originally designed for cold heading of wire-wheel spokes, but in this case, heading is done hot.

Push rod blanks fed to this machine are made of 0.270-in. diam SAE 1065 cold-drawn steel wire in coiled form. Straightening is done by passing the wire through rolls before it enters a cutoff machine. The tail end of each coil is butt welded to the lead end of the next coil so that wire feed is

MR. CHASE, engineer, former trade magazine editor and author of engineering texts, has been closely associated with industrial developments since 1910.

continuous. A flying shear cuts blanks to 10-in. lengths at the rate of 100 per min and drops them into tote boxes.

One heading machine extrudes the ends of the blanks to a 0.220-in. diam. The blanks are then transferred to the hopper of a double-end Waterbury machine and fed into a magazine automatically, Fig. 2. As each blank leaves the magazine, it is carried through the coils of a 20-kva General Electric induction heater where both ends of the blank are heated to a red heat.

Fingers on a vertical slide lower the blank into the holding portion of the heading die. A horizontal slide at each end of the holder carries an upset punch and a finish punch, located one above the other. As the slides move inward, the upset punches strike the first heading blows. The upset punches then are drawn back, shifted vertically and the finish punches are brought into alignment with the blank. The second blows are struck, the punches withdrawn, the holding die opens and the headed part drops onto a conveyor. The machine is now ready for the next cycle.

The end previously extruded forms a ball with a 0.183-in. radius. The other end is also upset and a punch at the center of the upsetting cavity produces a socket of 0.183-in. radius.

Cold-Heading Machines

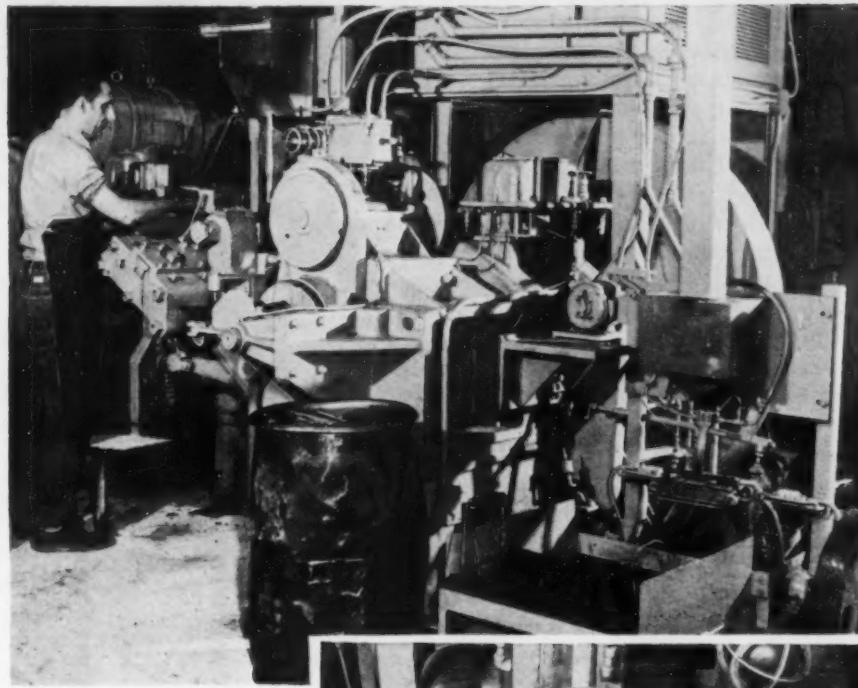


FIG. 1—This machine heads both ends of valve push rods for Ford valve-in-head engines. The push rods are heated by coils of a 20-kva induction heater before heading and again before quench.

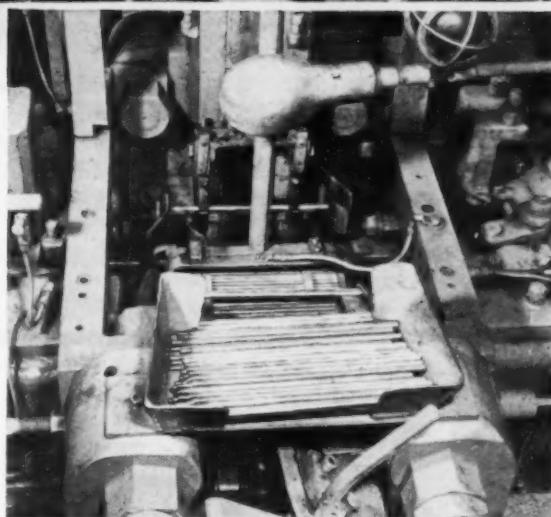


FIG. 2—Close-up of the double-end heading station. Blanks feed from the hopper to a magazine where both ends are heated by induction coils. Fingers on the vertical slide in back of the magazine transfer heated blanks to the heading dies located below.

Hardening of the headed ends is done in equipment added to the machine at the discharge end, Fig. 3. Each headed part drops off the conveyor into a pair of gear-like notches in the plates of a slowly rotating drum. To assure uniform heating, the push rods are first water cooled, then passed through the coils of an induction heater. When the ends reach proper quenching temperature, the push rods drop from the drum into a quench tank. A thermostatic control keeps the quench water at constant temperature.

The use of a double-end cold header for hot heading of induction heated parts is believed to be the first such setup. Its production is 31 parts per min and the only manual effort required is that of loading the hopper.

Another unusual heading job is done on a $\frac{1}{2}$ -in. National boltmaker toolied to produce valve tappets. The material used is a cold-drawn SAE 5120 steel wire of 0.499-in. diam. The only finishing operation required before the tappet is ready for use is grinding of the cylindrical surfaces and the end of the head.

The wire is drawn from a reel and cut into blanks. These are transferred to a heading station where the initial upset is made and a ball push pin semi-forms a corresponding recess in

the opposite end. Fingers automatically transfer the piece to a second heading die which completes the upset and finishes the ball socket. Trimming of the circular head to size and removal of excessive flash is done at the final heading station. The operations are similar to those in standard bolt heading except that the head is thinner and is circular rather than hexagonal.

From the heading operation, workpieces are

"Use of straight blanks eliminates or drastically reduces scoring of dies . . ."

transferred to a pointing station where the stem end is chamfered. No roll threading is necessary on the tappets, but a similar roll die forms an annular radiused recess under the head to a depth of 0.007 in. below the stem diameter. This recess provides clearance for the grinding wheel used to finish the tappet to final size. A production rate of 3000 tappets per hr is attained on this machine.

Cold-drawn wire is now used in the boltmaker for making tappets, but this machine will soon be equipped with a Hogue wire-drawing stand which is now used on many of the headers and boltmakers in the plant. With a wire-drawing stand, wire can be obtained in the hot-rolled state, drawn and passed through heading operations before normal age hardening affects the part produced. For this same reason, tool life is increased.

Hot-rolled wire also promotes flexibility in the operations. A greater number of parts can be made from one size and type of wire, eliminating the purchasing, stocking and handling of several sizes of cold-drawn wire. Another disadvantage of using cold-drawn wire is that the finish may be damaged by prolonged storage, especially in slow moving sizes.

When wire is cold-drawn at the machine, the extruded finish is clean. The blanks produced are straighter than those cut from coils previously drawn. The use of straight blanks eliminates or drastically reduces scoring of dies and minimizes tool upkeep.

Other parts that can be made on a boltmaker

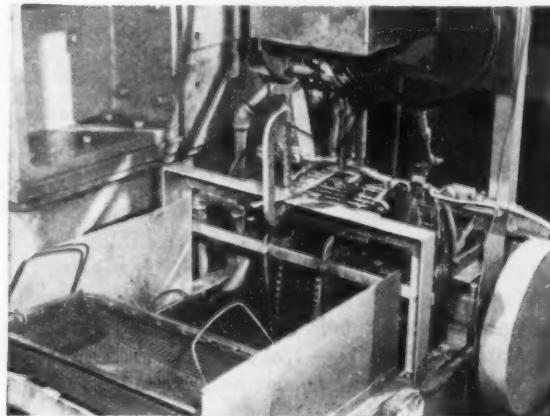


FIG. 3—Close-up of a drum which rotates slowly and carries valve push rods through an induction coil to be heated to quenching temperature. The rods drop from the drum into the quenching tank below.

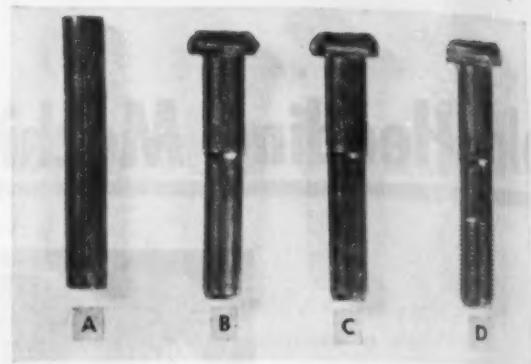


FIG. 4—Successive stages in the production of Ford connecting rod bolts: (A) blank cut from steel wire, (B) after extrusion, chamfering and heading, (C) after head trimming and (D) after thread rolling.

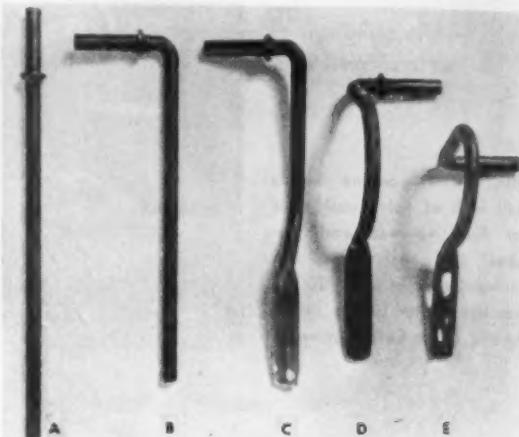


FIG. 5—Tractor hood hinge after various processing stages: (A) heading flange, (B) 90° bend, (C) offset and flattening, (D) first arching and (E) after final arching, piercing and drilling.



FIG. 6—Two-station die which performs two operations simultaneously. The die at the left makes the first bend in a tractor hood hinge and the die at the right does the offsetting and flattening.



FIG. 7—Magazine of special design feeds clutch release rod blanks through induction heating coils. The rods

then feed into the flattening dies of the press. The magazine is adjustable for size.

are rod bolts, Fig. 4. The material used for these is cold-drawn SAE 5135 fine-grain steel wire of 0.368-in. diam. The unusual features of this part relate to the unsymmetrical shape of the head and the impress under the head to remove any burr.

After a blank is sheared from the wire, the pitch diameter is extruded, a chamfer is formed at the outer end and the head is upset with a chamfer at the top and a 0.015-in. deep impress under the head. Next, the head is trimmed to shape. Because chamfering of the small end is done at the second station, it is not necessary to cut this chamfer as is normally done at a pointing station after a headed part leaves the die. Consequently, the pieces are transferred directly to the threading dies and rolled.

Most products made in this department are headed, but other parts also involve operations other than heading. Still others are produced from wire without any heading. The first step in making a tractor hinge, Fig. 5, is upsetting a flange about $1\frac{1}{8}$ in. from one end of a 0.369-in. diam cold-drawn steel wire. This job is conventional for a six-plunger Waterbury rod heater. Subsequent bending and flattening operations are done in press dies.

A two-station die, Fig. 6, makes a radiused 90° bend near the flange. The other station offsets and flattens one end of the piece previously formed at the first station. Since two pieces are in the die at each closing, the operations are per-

formed simultaneously. Another die arches the workpiece near the center. When the final forming operation is completed in the die, two holes are pierced through the flattened area and a small hole is drilled near the opposite end.

Only two simple operations are required to make a clutch release rod from a 0.440-in. diam soft steel blank which is cut in a Schuster wire straightener. Production of this item is facilitated by a magazine of special design, Fig. 7, a 20-kva Allis-Chalmers induction heater and an inclined Cleveland press equipped with a flattening die.

The magazine is loaded by hand and is inclined parallel with the press bed. It includes a C-shaped induction coil element at each side. Rods feed by gravity through slots formed by the faces of the coil elements. As the rods pass through the slots, the ends of each blank are raised to a red heat. The same magazine can be used for rods of slightly different length by making a small adjustment.

The press flattens the ends of the rod to a thickness of 0.180 in. At each opening of the press dies, a retracting pin releases the lowest rod from the magazine. It rolls into the die, whereupon the die flattens the heated ends and opens again. This cycle is repeated automatically as long as the magazine is loaded. Parts are subsequently fed through another die which pierces a hole in each end of the rod.

Modern Plating Equipment Is Designed For Any Shop

Semi-Automatic and
Full-Automatic Machines

Fourth of a series

By John E. Hyler
John E. Hyler & Associates
Peoria, Ill.

♦ TWO BASIC MECHANISMS are involved in the design of a fully automatic machine—one to convey workpieces and the other to raise and lower them at the plating tanks. Different devices are used by different manufacturers to accomplish this, but their purposes and functions are similar. Other devices are incorporated to minimize manual handling or to eliminate it entirely.

Each machine must be virtually custom-built. This is necessary to achieve highest production at lowest unit cost with parts of a specific size and shape. The machine must also be built for the particular finish to be applied. By careful planning of an initial installation, manufacturers can design the equipment for highest efficiency and in a way to make subsequent conversions simpler.

Early attempts at automatic operation resulted in a screw-type semiautomatic conveyer. Years later, a roller-type conveyer was used, then a slotted-cathode type. Still later, a sliding pusher type appeared. Constant improvements resulted in an efficient conveyer which is in wide use today.

This conveyer is equipped with a heavy-duty 4-in. pitch conveyer chain running around two sprockets in a horizontal plane, Fig. 1. Four 6-in. channel columns are assembled vertically near the tank ends to support two heavy cross members. A pair of 3 x 4 in. angles are suspended from the cross members. The framework thus formed holds the cathode rail and chain guide rail.

The heavy-duty conveyer chain has conical points at 4-in. centers which extend upwards, Fig. 2. The points receive and hold carriers which in turn support and traverse the plating racks. A sprocket at one end of this chain is driven by a motor with an integral variable-

♦ Modern automatic plating machines must be custom-built for a specific type of work if highest production at lowest unit cost is expected . . . The types made are similar functionally but differ mechanically.

♦ All perform with an exceptionally high degree of efficiency both cost-wise and quality-wise . . . Designs vary widely but careful planning of initial installations enables subsequent conversions with minimum effort.

♦ Special devices, such as loaders, unloaders and drying equipment, reduce manual handling and provide for better timing schedules.

speed mechanism. At the output end of this mechanism is a double-worm gear reducer totally enclosed in a gear box. A sprocket at the other end of the conveyer is fitted to take up slack.

Carriers on the conveyer chain are provided with collector fingers for uniform transmission of current. For light current loads, a boss on the back of the carrier contacts the cathode rail. The collector fingers, which are held under spring tension, are self-lubricating and are made of copper or graphite. Extra fingers can be added for work requiring heavier current loads. Reverse polarity can be made available, when required, by using both anodic and cathodic contact rails.

Workpieces may be put to motion in various ways as they traverse the solution. Either continuous or intermittent rotation may be imparted to the rack from the suspension point of the carrier. Agitation may also be applied to some machines by means of horizontal oscillation, but this necessitates auxiliary drive to actuate a horizontal drive shaft. Cross bars riding on steel rollers impart this movement to the carrier yokes which hold the work. Thus, the normal traversing motion of the work and the horizontal oscillation provide sufficient agitation of the solution to distribute the deposit uniformly.

In addition to the two motions described, an-

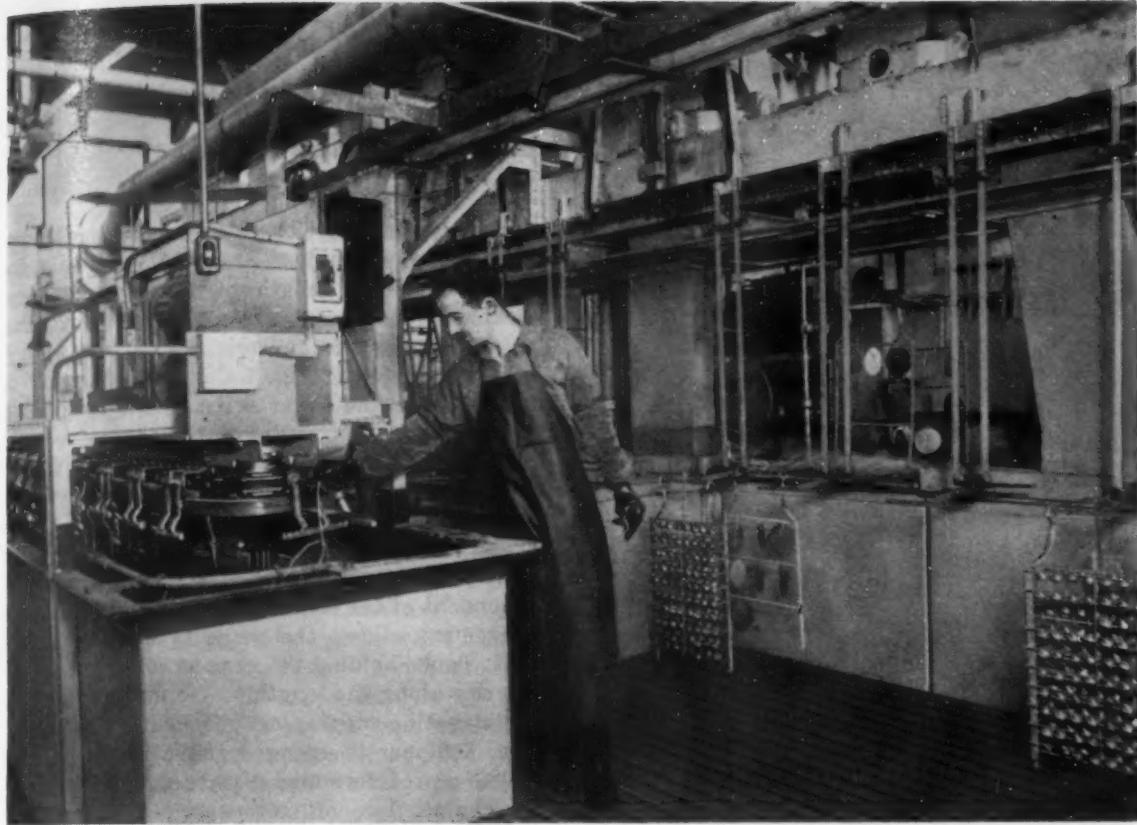


Fig. 1—Semiautomatic conveyer used in conjunction with a full-automatic unit. The full-automatic does the pre-

plating treatments, final rinsing and drying. Courtesy Hanson-Van Winkle-Munning Co.

other type of semiautomatic conveyer provides a reciprocating motion paralleling the direction of chain travel. The washing action resulting from this movement minimizes or completely eliminates hydrogen pitting. A separate electrical control connected into the circuit of the drive motor is required for the reversing action. This control allows the machine to coast for a few seconds before each reversal to prevent excessive swinging of the plating racks.

Another type of semiautomatic machine has a round cathode rail. Bronze carrier hooks mounted on the rail move very freely. A roller-type conveyer chain travels in a horizontal plane around two sprockets, but it has suspended pushers to move the carrier hooks along the cathode rail. The hooks are designed to prevent swaying or jerking of the work when the machine is in operation. A motor and variable-speed reducer drive this machine.

The chief advantage of a semiautomatic machine is that only one operator is usually required to load and unload the work. This is opposed to a number of operators required to serve several still tanks. Another important advantage is the predetermined timing cycle that can be established with a semiautomatic machine. This eliminates the possibility of human error and results in more uniform deposits.

Unlike a semiautomatic machine which carries the work through only one phase of the

plating operation, a full-automatic machine takes the work through all operations. This requires a mechanism for automatically moving the work in and out of each bath. Just as the term implies, little human effort is required in its use. Very close control over plating quality results in far fewer rejects and the work loads are greater than with other types of equipment. There is also less dragout of solution.

One type of full-automatic, known as an elevator type, uses crank arms extending from out-

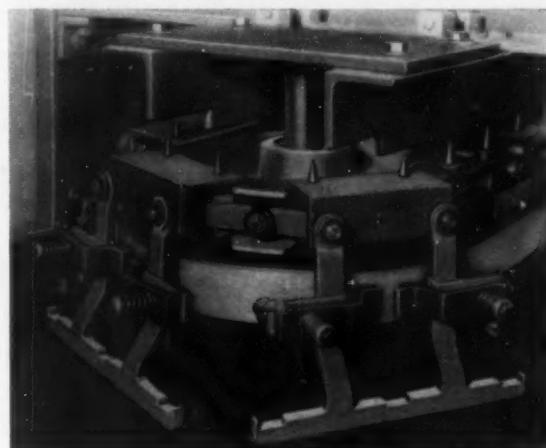


Fig. 2—A typical heavy-duty carrier of 300-amp capacity for a semiautomatic conveyer has two collector fingers under pressure to prevent a break in current flow. Courtesy Hanson-Van Winkle-Munning Co.

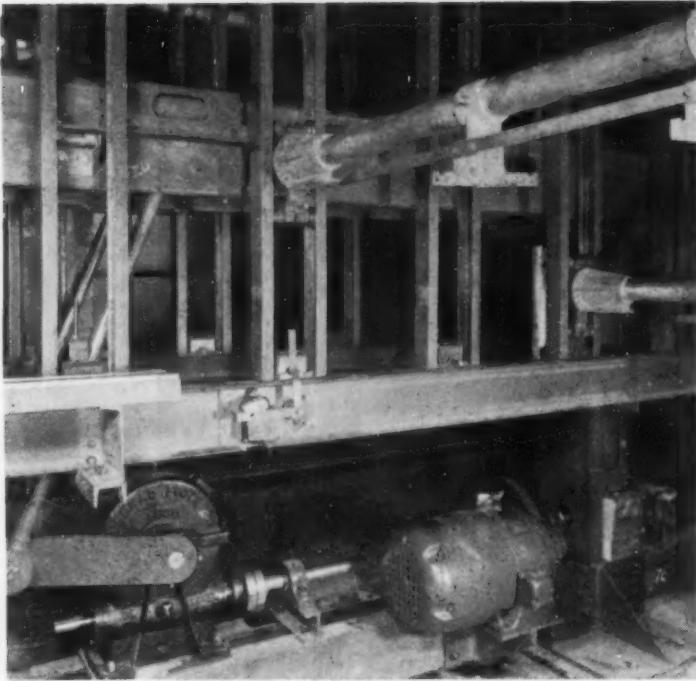


Fig. 3—The closed flipper lifts the carrier on this elevator-type full-automatic. Note the flipper reset rod which is normally open, and the forward travel safety switch. Courtesy Hanson-Van Winkle-Munning Co.

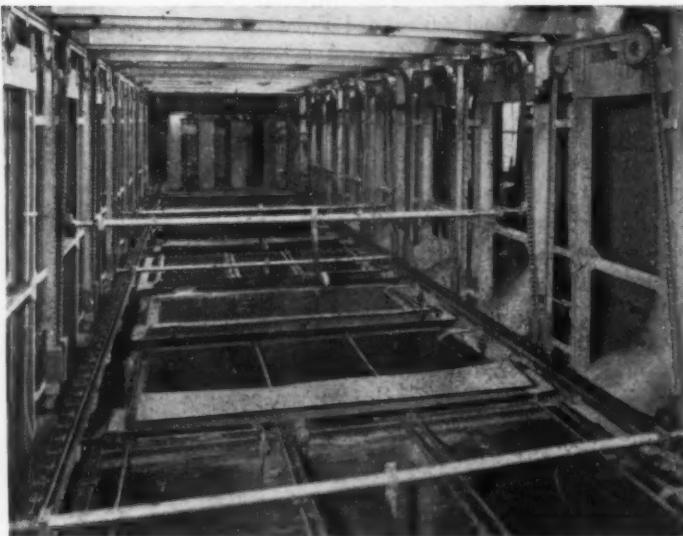


Fig. 4—Chains are an important part of an automatic plating machine. Work is suspended from horizontal support bars riding on horizontal bus bars and engaging parallel strands of chain which propel the work. Roller chain fitted with carrier cups transfers the work from tank to tank. Courtesy Link-Belt Co.

put shafts of gear reducers and mounted in bearings on vertical shafts. A number of gear reducers, operated by a common shaft, are equally spaced along the entire length of the machine. The two crank arms on each shaft connect to two lifting rods which in turn are connected to the elevator mechanism. Counterweights offset the gross load imposed on the gear reducers.

Two sprockets on a vertical shaft at each end

"Arm attached to 'roller skate' travels vertically between each pair of channels . . ."

of the machine drive two heavy conveyor chains. Steel channel guides, arranged vertically in pairs along the length of the machine, are located at specific intervals. Each pair of channels embraces and controls the vertical travel of a "roller skate," Fig. 3. Channels are secured to the upper and lower drive chains by special attachments and travel with the chains. A horizontal carrier arm attached to each "roller skate" travels vertically between each pair of channels. The carrier arms support the racks which hold the work.

Forward travel of the two drive chains is independent of the elevating mechanism. This arrangement allows the work to dwell in each tank. Tanks holding the various solutions are in a series along the length of the machine. When the elevating mechanism reaches the top position, a flipper is engaged and all carriers are moved a predetermined distance by the horizontal chains. Two or more carriers may be assigned to a tank. In such cases, the carrier arms remain down and are driven forward by the chains.

Racks and carriers remain down for loading and unloading when they reach the end positions. If the machine is equipped with a blast-type dryer, the carriers will ride on a fixed track in the top position. This operation is independent of the elevator movement. Other adaptations are also possible. For example, when teamed with a semiautomatic machine, it performs all treatments before and after plating, including drying. Machines of this type range in length from 25 to 175 ft and may include as many as 30 treatments.

Supports ride on bus bars

One of the chief differences between plating conveyors is the manner in which work is transferred from one tank to another. One popular type of machine suspends the work from horizontal support bars which ride on bus bars, Fig. 4. Strands of chain engage the support bars and propel the work across the tank. Chains traveling vertically along the front and back of the tanks and in registration with the tank partitions are equipped with carrier cups which also engage the support bars. These chains lift the work from the tank, carry it horizontally, lower it into the next tank and rest it on the horizontal chains which again move the work through the solution.

Some machines, equipped with special aluminum carrier arms attached to the conveyor chain lift the work from one tank, carry it along and lower it into the next bath, Fig. 5. One such

"Delayed set-down mechanism can be built into machines for independent timing of tanks . . ."

machine has a shaft keywayed its full length except at the bearings, Fig. 6. Cams which actuate the carrier arms are split. Racks may be on the carrier arms at either end, anywhere between the ends and on either side of the machine. This machine may be operated clockwise or counter-clockwise.

A special delayed set-down mechanism can be built into these machines for independent timing in one or more of the tanks, Fig. 7. If desired, any tank or operation may be skipped. Bipolar arms can also be used for plating parts of intricate shapes at high or low current requirements. Some carrier arms are of the double-row type to carry two racks while others are equipped with an agitating link to provide vertical movement of the cross arm.

Another machine of a similar type uses stationary hump-type cams instead of revolving cams. These cams are located where the arms lift, traverse in the up position and lower, but may be relocated easily when necessary. The roller of each carrier arm follows the roller track and traverses the cams in order. The mechanical principle of this system is simple and reduces the possibility of breakdown.

Cams raise, lower work

One machine designed for high production of small parts also uses hump-type cams for raising and lowering the work. Instead of carrier arms, this machine has perforated plating baskets mounted at the ends of spindle assemblies, Fig. 8. A bronze wormwheel located between the plating bracket and the chain bracket of each spindle assembly automatically meshes with a steel worm as the plating basket is lowered into a tank. This permits the plating basket to rotate continuously while it is in the bath, thus imparting a tumbling action to the work.

When the cam raises the spindle assembly, the wormwheel and worm become disengaged and rotation of the plating basket stops during transfer from one tank to another. This same procedure continues throughout until treated parts are automatically unloaded into containers which convey the parts from the machine.

Transfer time is constant but the timing cycles for plating and dwelling can be varied widely. Control over these movements allows for wide adjustments in the plating operation. Such machines can process bolts, nuts, screws, small stampings and other similar work at a rate upwards of 1000 lb per hr.

Hydraulic controls are used effectively on some return-type plating machines for lifting, transferring and lowering the work. Work car-

riers ride on a one-piece cathode rail which supports the work and acts as a conductor. Where transfer of work is required, a section of rail which is lifted hydraulically raises the work from the tank. The carrier is then moved horizontally by a hydraulic pusher, after which the work is lowered into the next tank without swaying or jerking. Lifting, transferring and lowering can be controlled separately and at any desired rate.

Independent regulation of the three transfer motions makes it possible to reduce dragout and contamination of the solution. Simple one-piece carriers reduce current loss and improve plating efficiency. Other types of work carriers are available for special applications, including one with an auxiliary anode bar for interior plating.

These machines are built in single- or double-row style and for low or high lifts. Single-row machines can be equipped with a non-lifting section to provide for cathode-rod agitation. The agitating device is installed on a separate section of the cathode rail and is actuated in a

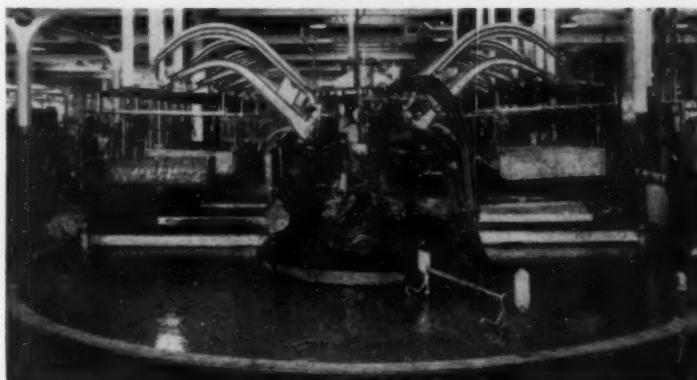


Fig. 5—Special design of full-automatic unit for bright dipping. It uses the arms to lift and lower the work from tank to tank. Courtesy of Frederic B. Stevens, Inc.

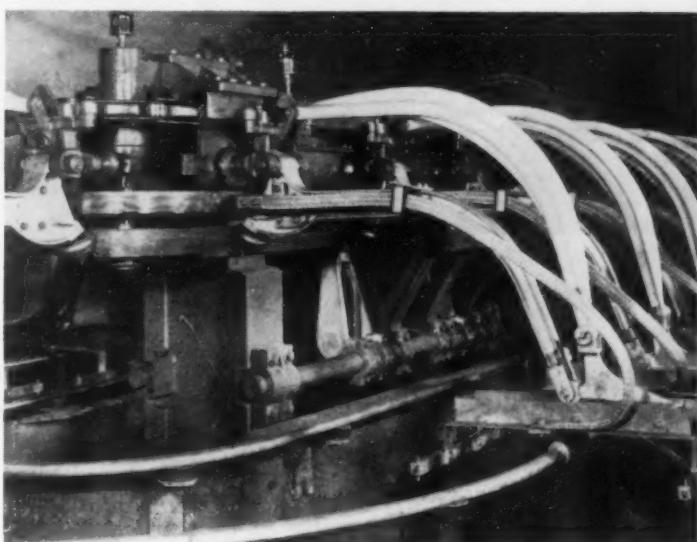


Fig. 6—Rack-type full-automatic machine showing view of carrier arms, heavy-duty contact shoe and insulated cross arms. Courtesy of Frederic B. Stevens, Inc.

smooth back and forth motion by mechanical means. Agitation removes hydrogen bubbles which tend to form during nickel and copper plating. The result is smoother, more uniform deposits.

In stages where automatic lifting is not re-

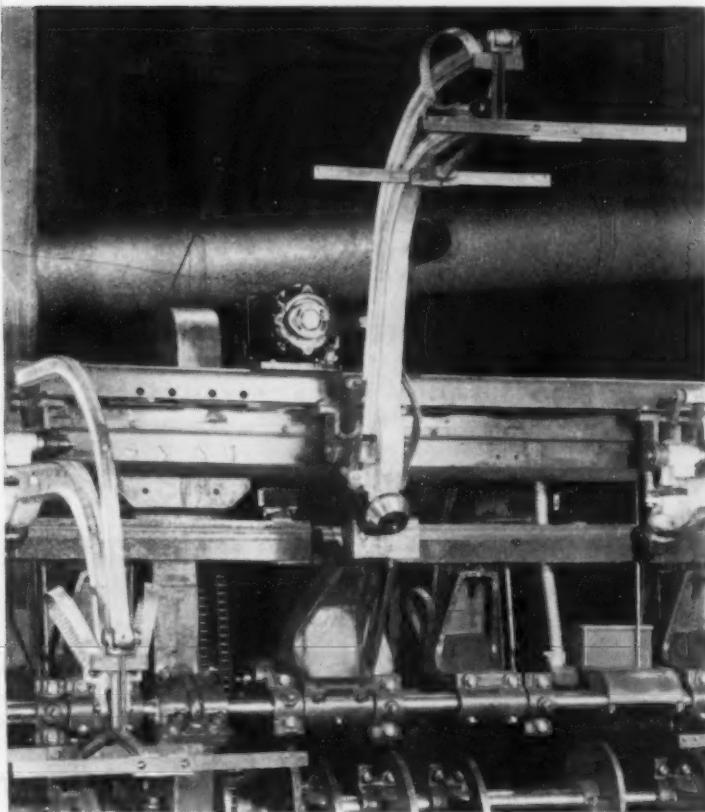


Fig. 7—The set-down mechanism on a rack-type full-automatic unit permits timing at any tank or skipping an operation. Courtesy Frederic B. Stevens, Inc.

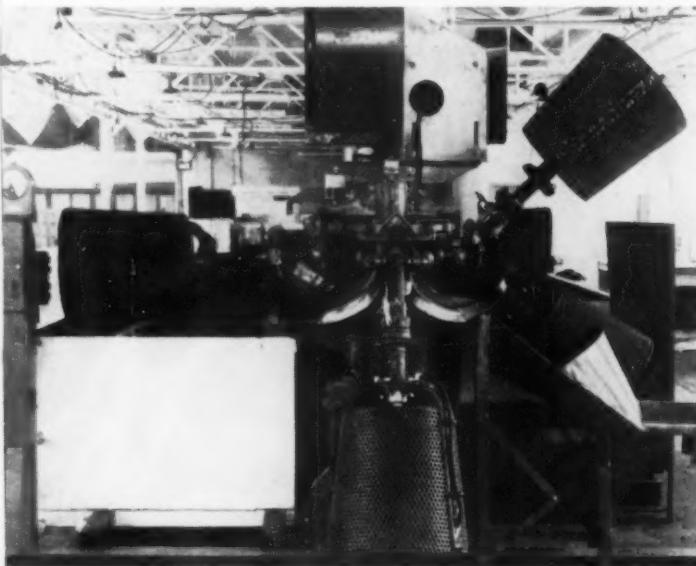


Fig. 8—Small-parts full-automatic plating machine uses perforated baskets mounted on special spindle assemblies for carrying workpieces. Cams raise and lower the baskets. Baskets in foreground are shown in four positions: raised, loading, lowered and unloading. Courtesy Frederic B. Stevens, Inc.

quired, an adjoining long U-shaped tank may be installed for plating exterior automotive hardware and other items requiring heavier thicknesses of deposit. A simple pusher mechanism advances the work through this tank. With normal and double speeds possible, different thicknesses of deposit can be made without changing the time cycles for cleaning and rinsing.

Lifting and lowering motions on another type of full-automatic can be obtained either by pneumatic or hydraulic means. A motor-driven chain provides the horizontal motion. The first operation of this machine is a cleaning cycle in a tank equipped with a circulating pump and 44 steel nozzles which release the solution under pressure. This is followed by a 45-sec warm rinse. The work is then electro cleaned for about 5 min during which time it is agitated vertically at the rate of 32 strokes per min. Zinc plating for 10 min is then followed by two rinses and a 3½-min drying operation.

Hand unloading eliminated

One rotary full-automatic machine, having a hydraulic drive, is used for large and cumbersome parts rather than for high production. It requires more headroom and floor space than other types of machines but its larger racks enable handling of heavier loads. This machine has few parts, is easy to install and requires little maintenance. The tanks may be arranged like spokes of a wheel or located on the outer edge like the rim of a wheel.

In recent years, a number of electrolytic tin plating lines, operating at speeds up to 1000 ft per min, have been installed. Full-automatic machines of this type deposit tin to very accurately controlled thicknesses. Other continuous plating lines are used for wire, cable and similar products. One such machine plates zippers which have already been assembled to cotton tape.

Automatic loading and unloading equipment is used with some full-automatic machines. It eliminates manual removal of racks from and placement on the plating machine. Further saving of effort is possible at the racking station where the conveyor may be brought to working height. Here the parts can be racked and unracked without removing the racks from the conveyor. Special unloaders are used in some plants where space for a large machine is limited.

In some cases, the plating cycle can be divided into two phases by using an automatic loader as an intermediary. Controls of both machines and the loader must be interlocked for proper timing.

This article is the last of a four-part series. The subjects of previous articles and dates of publication were: Part I, plating barrels and tanks, Jan. 22; Part II, filters, pumps, temperature controls, agitators, exhaust systems and racks and tapes, Jan. 29; Part III, generators, rectifiers, busbars and control equipment, Feb. 5.

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Cue to the extra staying-power of Crane Ni-Resist Cast Iron Valves is in their make-up (approximately 14% nickel, 2½% chromium, and 6% copper)—and in their 18-8 Mo Alloy Steel stem and seating faces. Not to be overlooked is the fine Crane design that gives you a strong body and bonnet without excessive weight, a well-proportioned stem with precision-cut threads, a sturdy yoke, and the dependable disc-stem connection that assures smooth operation and tight sealing of the solid wedge disc. Ask your Crane representative for full details, or see your Crane Catalog.

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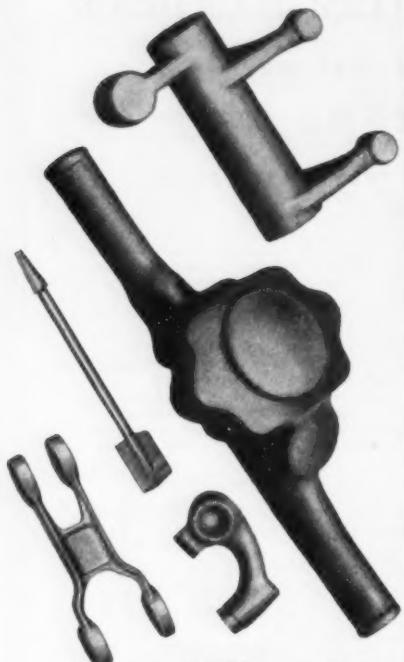
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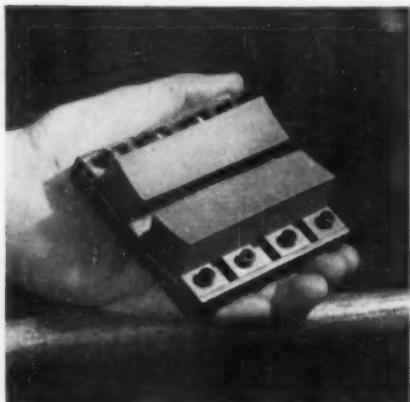
MILL ROLLS:

Better roll finish permits longer life, greater loads.

Maintenance of mill rolls is a never-ending problem. A well-known rolling mill, which produces stainless steel strip stock, decided to make some tests. Objective was two-fold. First, they wanted to extend the working life of the individual mill rolls. Secondly, they wanted to reduce the time and expense of refinishing the rolls. Gisholt Machine Co. assisted in making the tests.

Longer Run — Test rolls were shipped to Madison, Wis., for special finishing. These were then returned to the mill. In production it was found that one set of Superfinished rolls ran 36 machine hours, as against less than 8 hours for a similar set of ground rolls.

In another test the rolls handled 280,000 lb before refinishing, as against less than 100,000 lb with ground rolls. In a salt spray test it showed there were less iron inclusions in the stainless steel rolled



HEADS CARRY quickchange stoneholders. Stones are vitrified bonded abrasive. Each stone is dressed to the work radius to give an area rather than a line contact.



TWO OF MANY rolls used in rolling stainless steel. Surface roughness of finished roll measures 1 microinch rms max.

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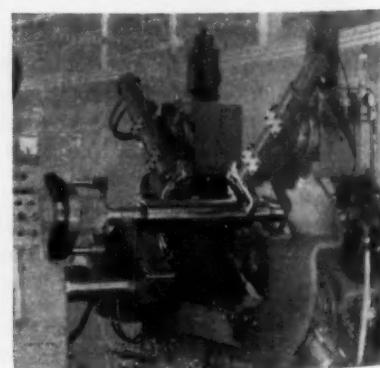
You may secure additional information on any item briefed in this section by using the reply card on page 89. Just indicate the subject heading and the page on which it appears. Be sure to note exactly the information wanted.

strip when the mill roll had been Superfinished.

Automatic — Based on these tests a Model 78 Mill Roll Superfinisher was ordered and is now in use in this plant. The machine has a completely automatic cycle and is adjustable to handle a wide variety of mill rolls up to a 20 in. in diam and 36-in. roll working surface. Rolls with a single or double crown measuring from 0.001 in. to 0.007 in. are also handled on this machine.

The cycle starts with the operator loading the roll into the machine. The roll is driven with a special adapter, is supported with a tailstock, and rests on its own bearings. As the roll is driven, the Superfinishing stones contact the work and are oscillated and traversed back and forth over the length of the roll.

Three Stages—Three automatic changes of spindle speed give roughing, semi-finishing and finish-



FOUR HEADS with bearing support and driving adapter are used in Superfinishing machine. Stones oscillate and traverse to scrub away amorphous metal.

Engineering and Production Ideas

ing operations. At the completion of the cycle the spindle brake is applied, the roll is wrapped to protect the surface and is then removed from the machine. Additional tests are now being carried on at the mill. The complete Superfinishing operation is taking a maximum of 15 min, depending on the size of the roll.

Tests on stones are giving a resultant surface roughness of 1 microinch or less. Life of the Superfinished roll has generally been found to be three times the life of ground rolls.

DIAMOND TOOLS:

Rustproof holders resist corrosion, retain size.

Diamond tools built into rustproof holders have been developed by Diamonds & Tools, Inc., Detroit.

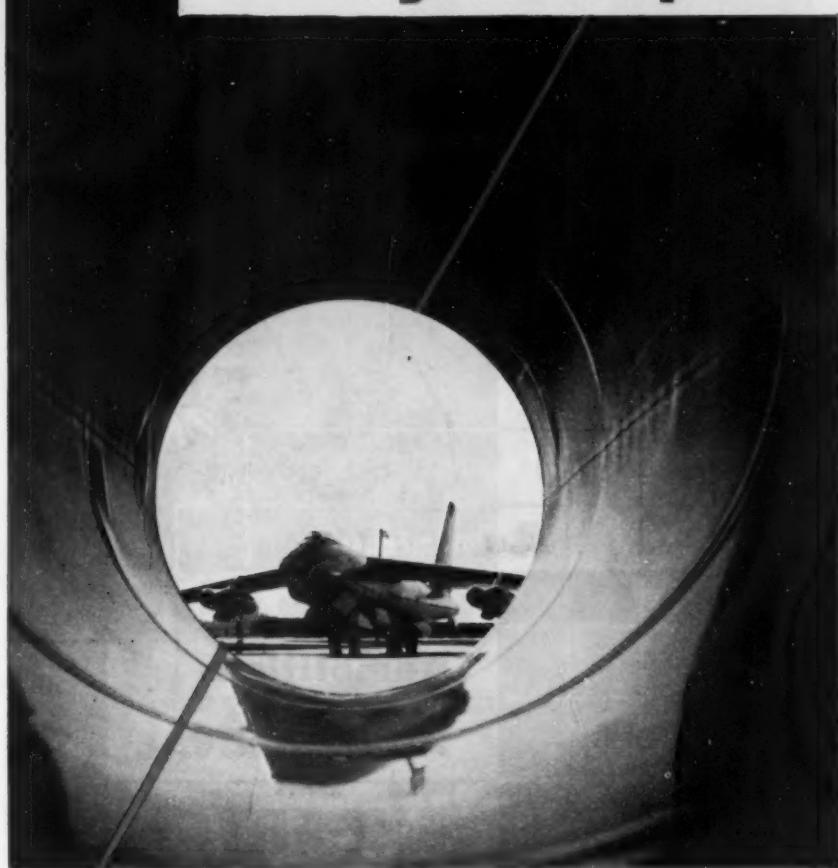
Tool holders, surfaced with an oxide coating, resist the corrosion which usually occurs on conventional uncoated holders held in stock or subjected to action of corrosive coolants. Shanks retain their size and fit in diamond dressing equipment throughout their useful life.

Better Bond—Diamonds in the improved holders are set with a special Colmonoy alloy. This alloy has a low melting temperature, excellent thermal conductivity, extreme wear resistance. An extremely low coefficient of expansion approximates that of the diamond. The diamonds are set in the holder under heat and pressure.



DIAMOND HOLDERS resist corrosion resulting from exposure to atmosphere or coolants. Results are longer life, better fit in dressing equipment.

The Right Viewpoint



When you're thinking about aluminum or magnesium castings, you need the services of an organization with the right viewpoint.

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Technical Briefs

Continued

INJECTION MOLDING:

Low cost press has flexibility, better temperature control.

A pneumatic plastic injection press which develops injection pressures up to 70,000 psi has been developed and placed in use by Argonne National Laboratory at Lemont, Ill.

The press, developed by the

Laboratory is a departure from conventional hydraulically operated presses. Two features are unique to plastic injection presses.

Flexibility — Great flexibility has been achieved in control of operating pressure. The press is driven by an air cylinder and is controlled entirely by electric valves so arranged that the speed

of injection is controlled by an adjustable throttle valve.

When air pressure in the air cylinder reaches a pre-set value, an automatic short circuit of the throttle valve takes place and the air pressure in the cylinder suddenly increases to the desired value.

Pressure Increase — When the injection cylinder is nearing the end of its stroke, a sudden increase of pressure is applied. A pressure of 1 psi on the air cylinder exerts a pressure of 500 psi on the piston of the injection cylinder.

Another unique feature is the temperature control system. In molding critical parts such as optical components and electrical insulators, rigid control of the temperature of the plastic is required.

Independent Control — This control is obtained by having the temperature of the upper section of the injection cylinder controlled independently from the lower section which consists principally of the plastic spreader and nozzle.

The lower section of the injection cylinder is constructed of extremely thin stainless steel, 0.010 in. thick at thinnest point. Shrunk on to this thin-wall section are heavy copper collars which provide the additional support needed to withstand the high pressure.

Fastened to the copper collars

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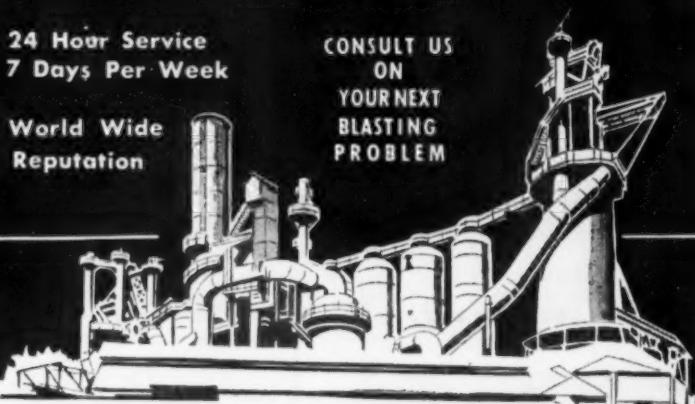
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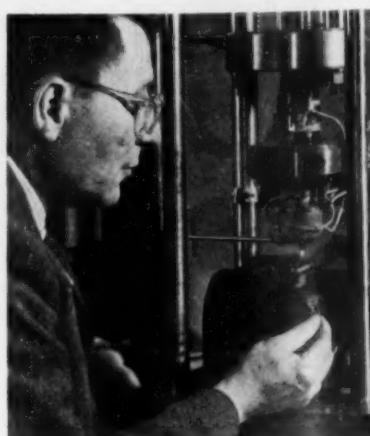


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UNIQUE pressure and temperature controls are built into new injection molding press at Argonne National Laboratory.





PLASTIC optical piece produced on 70,000 psi air-actuated injection molding press is inspected by Dr. Francis R. Shonka, right, and Robert Magil.

are electrical heating bands which supply the heat to melt the plastic. The heat is conducted through the copper collars and thin-wall to the plastic.

Enters At Top — In operation, the plastic enters the top of the injection chamber and is converted to a liquid state while in the upper section of the chamber. As it moves downward toward the mold, it is heated to higher temperatures and when it enters the mold, it is at exactly the desired injection temperature.

Inasmuch as copper is a good heat conductor, there is less temperature lag (over-heating and under-heating) than in conventional injection presses. This rigid control of the temperature is extremely important in molding optical components and electrical insulators as over-heating would produce carbonization while under-heating would result in serious stress conditions in the material.

Components for the press cost less than \$1000 and can be assembled and tested in about 250 hrs.

River Gas Station Lighter

A new porcelain-enamedled steel curtain wall used in the exterior construction of a sea-and-land gas station, to be erected on an East River, New York City dock, will produce a building 80 pct lighter than with conventional materials.

Turn Page



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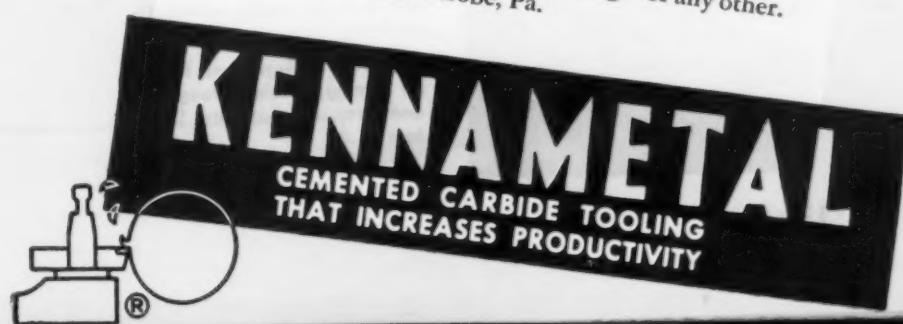


The right angle chucking lathe, tracer controlled, provides for efficient profile machining of workpieces having large diameter, short length, and thin wall sections, particularly those made of stainless steel and heat-resistant alloys.

To complete the set-up, an appropriate cutting tool is required. It must be shaped to accurately follow the lead of automatic control, face up to the job, and cut corners with maintained precision.

For this very purpose a Kennametal tool has been designed. The mechanically-held triangular insert, seated in a hardened V trough, provides a sturdy design in a 50° nose angle tool that will withstand lateral thrust, and can be modified to smaller nose angles and radii as required by specific profiling conditions.

Four shank sizes are available in three different styles — righthand, lefthand, and neutral, as illustrated in the sketches. See Catalog 52, page 45 for specifications. Confer with our Tool Engineers if you need help in this type of tooling—or any other. Kennametal Inc., Latrobe, Pa.





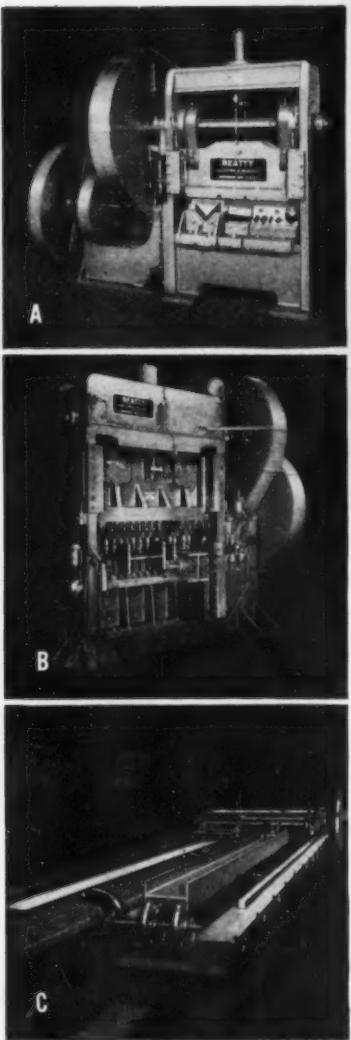
MAGICIANS

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Technical Briefs

FINISHING MAGNESIUM:

You can get better results with these simple rules.

By careful cleaning and by following simple rules for finishing better and longer lasting finishes are possible with magnesium products, the Defense Plants Administration reports in a recent technical bulletin.

Good organic or grease solvents, alcohol or any good vapor degreasing technique will remove surface contaminants like shop dirt, shaping and forming residues or shot blasting sand from magnesium. After such cleaning, workpieces should be thoroughly rinsed.

If burned into the surfaces or if oxide layers are present, use a recommended chromatic acid solution. Chromate baths offer excellent treatment for cast and wrought magnesium alloys as well as for magnesium-manganese sheets.

Boiling—Parts are immersed in a boiling bath solution of potassium and ammonium dichromate. These are common bath solutions supplied by reliable commercial chemical concerns.

Contaminants which remain on the surface after shot blasting may be removed with a watery solution containing a small amount of sulfuric acid. If the workpieces are made of an alloy like AZ92, addition of a small amount of nitric acid will improve its cleaning.

Apply Primer—After cleaning, and before final painting, a suitable primer should be applied with the aid of a dichromate treatment or through galvanic anodizing. This provides a good base for the final painting.

Selection and method of treatment are often controlled by atmospheric conditions to which the workpieces will be subjected. As an example, after cleaning the workpieces with the chrome pickle method, one coat of primer such as the zinc yellow is adequate for indoor service. This treatment is

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F. BEATTY Gap Type Press for forming, bending, flanging and pressing. Capacity 250 tons.

then followed by the final finish
coating.

For Outdoors — For outdoor treatment, workpieces should be cleaned by a chrome pickle method, followed by a dichromate or galvanic anodizing treatment before finishing with a good paint.

For commercial finishes, lacquers or synthetic resins are generally specified. If specifications require protection against wear, abrasion or tarnish with no color change, clear lacquer will be satisfactory.

Electroplating—Where electroplating is specified it is best to first provide an adherent nickel deposit layer and cover with cadmium or chromium.

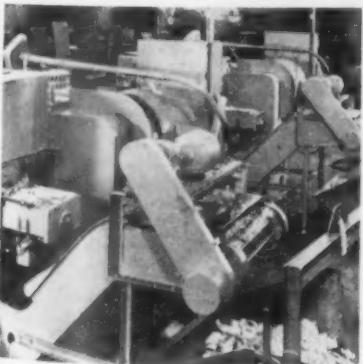
CHIP HANDLING:

Automatic scrap removal helps raise lathe output.

Automatic scrap removal conveyors are speeding production at the Coit Road Works of Thompson Products, Inc., Cleveland.

By continuously removing the large volume of chips generated by Sundstrand automatic lathes, they eliminate periodic shut-down for manual scrap removal and assure uninterrupted operation of these high-production machines.

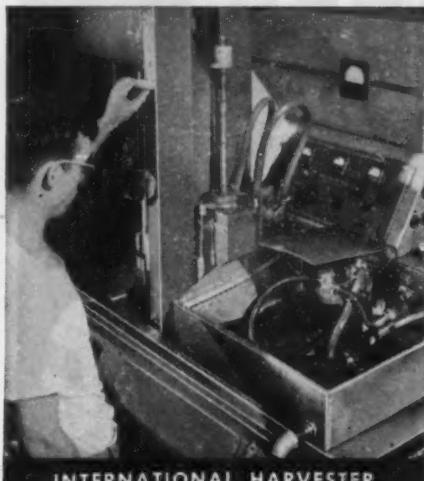
Under Lathe—Receiving end of the Chip-Tote conveyor developed by May-Fran Engineering, Inc.,



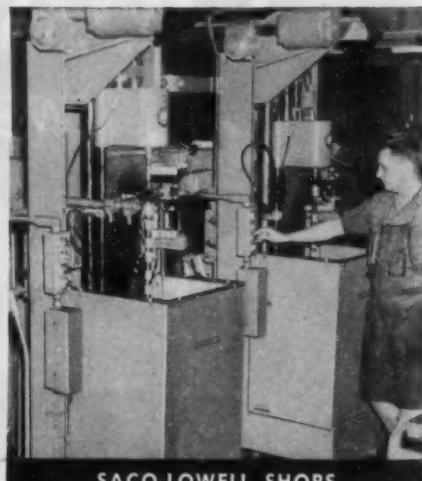
GET MORE from your automatic lathes by installing automatic chip removal units. Installed here on Sundstrand automatic lathes, the conveyors take out chips, drain cutting oil back to reservoirs.

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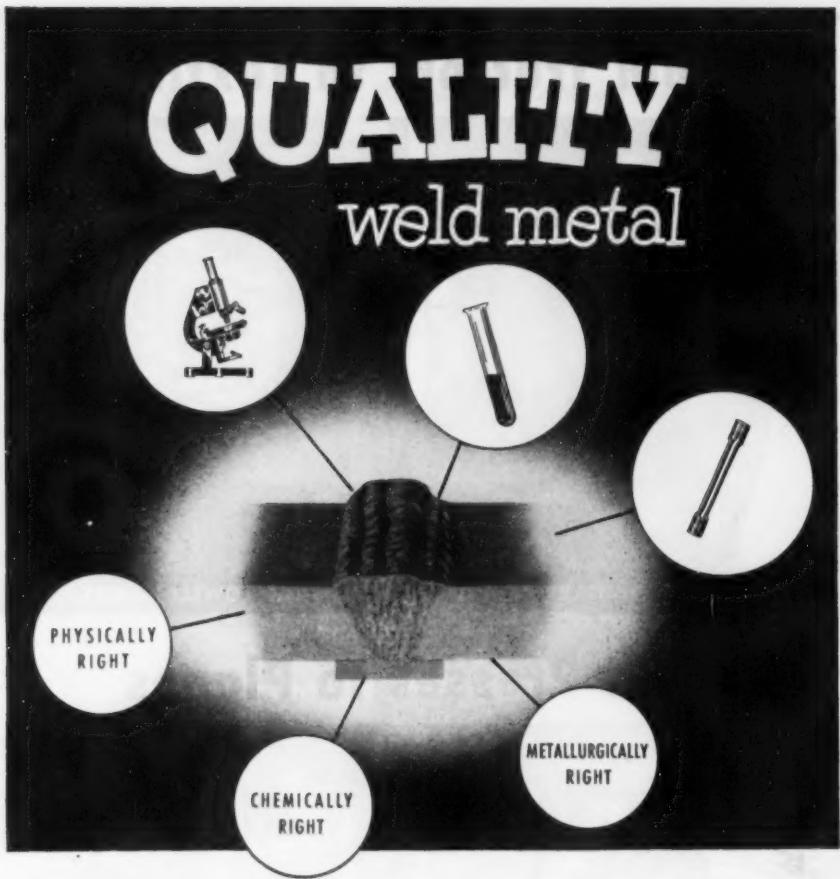
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Technical Briefs

Cleveland, is located directly beneath the lathe's tooling. Chips fall onto the hinged-steel belting and are carried clear of the lathe's operating mechanism, and transported up a 60° incline for discharge into tote boxes.

Coolant drains through the perforations in the belting and is returned to the reservoir at the base of the lathe. Power to operate the conveyer is supplied by an integrally mounted electric motor and reducer through an adjustable clutch.

If a load in excess of a pre-set limit is imposed on the conveyer belt, the clutch will slip to prevent possible damage to personnel and equipment.

Fits Many Machines—The units can be used to remove hot, wet or dry chips, turnings and borings from a wide range of automatic or multiple-spindle production machines while they are in operation. Various sizes fit most standard models and can be custom-engineered from stocked component parts to serve practically any type of machine tool.

Design permits modifications according to the type of machine tool, space available, type of metal scrap, rate of removal, etc.



TANKS AND DUCTS can be built to almost any size or shape using Fiberglas reinforced polyester laminate. No molds are used in making the ducts. One big advantage, according to Ferro-Co Corp., is lack of chipping, crazing and cracking.

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IRON SULFIDE ORES:

Minnesota ores may yield new sulfur, manganese sources.

Iron sulfide deposits in Minnesota's Aitkin and Carlton Counties may provide a new sulfur industry, and prove to be the missing link in the development of Cuyuna Range manganese.

Laboratory tests on iron sulfide ores from two deposits in the Minnesota counties averaged an 87 pct recovery of sulfur, the Bureau of Mines recently reported.

Low Silica Content—The relatively low-silica content of the concentrate also indicated that a high-grade iron oxide sinter suitable for blast furnace use by the steel industry could be produced after recovery of the sulfur from the concentrates.

Flotation tests were conducted by Bureau metallurgists at the University of Minnesota, Minneapolis, following an extensive drilling program during 1950 and 1951.

Manganese — Possible use of these iron sulfide deposits in the development of a Minnesota manganese industry from Cuyuna Range manganiferous ores may be possible.

Using sulfur dioxide gas, the Bureau is conducting pilot-plant tests in the recovery of manganese from Cuyuna carbonate slate ore in a sulfatizing furnace. This will be followed by the final leaching step in a flotation mill to be installed in the Bureau's manganese pilot plant at Fort Snelling.

Minnesota's Cuyuna Range has about 500 million tons of low-grade iron material containing from 10 to 25 million tons of manganese. Of the total manganese used by the steel industry, only about 10 pct is furnished by domestic producers.

Following the Bureau investigations, The M. A. Hanna Co. took an option on the property in Aitkin County, and conducted an extensive drilling program. Four tons of the ore were sent to the Bureau's laboratory at Minneapolis, where tests were made.

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Consumers Start Scrambling to Get on Order Books

Decontrol touches off market melee . . . Consumers rushing to get on mill books . . . Want historic consideration in free market . . . No big new wave of inflation is expected.

Hot on the heels of steel decontrol moves in Washington, consumers are descending on steel companies in what promises to be mad scramble to "get on the books."

Reasons for Haste . . . There are several reasons for the urgency and speed of their reaction: (1) They want first crack at any "free steel" not already allotted to ticket holders between open-ending of the Controlled Materials Plan now and when it is finally dissolved June 30.

(2) Since they are now free of unit restrictions on their own production, many steel consumers will be able to use even more steel, copper and aluminum than they had contemplated.

(3) Knowing that steel mill policy is to generally take care of customers on a historic basis, they want to be on the books so the mill will have them listed as a regular customer.

(4) Sad experience in other periods of steel shortage has taught many consumers, big and small that it is best not to put all their eggs in one basket; their chances of getting steel are better if they have more than one source of supply.

(5) After more than 2 years of steel distribution under CMP many historic customer relationships had become distorted or obliterated. Now quick moves are being made by mills and customers to restore mutually advantageous connections.

(6) Under f.o.b. method of selling steel it is advantageous for consumers to get their steel from nearby mills to save freight costs. As competition becomes keener, it becomes absolutely imperative.

CMP distribution procedures and government directives had, in many instances, made this impossible.

Military Insurance . . . The incentive to restore mill-customer relationships is mutual. To the mills these historic relationships represent hope for bread and butter accounts in less booming times. To the consumers they mean a better chance of being "taken care of" during times of steel shortage.

After CMP ends June 30 military and atomic energy steel needs will be assured by a system of simple priorities. Mills have already publicly committed themselves to make sure that all such needs are taken care of.

Hottest Corner . . . Reaction to immediate open-ending of CMP is quicker than many had expected. Detroit's procurement fingers were feeling and testing the market long before decontrol was contemplated. Auto makers have had one eye trained on their race for the consumer market while the other eye has been looking for a chance to get out from under substantial costs of conversion steel.

While playing the conversion market to the hilt because it helped them increase their competitive share of the sales pie, auto makers have long been intrigued with the possibilities of holding their prices level (or even lowering them) by virtue of conversion savings. Race horse competition in that industry assures that such savings will be passed on to the consumer. Because of its competition and ingenuity, that industry has borne a large share of conversion costs, resulting in greater production

than would otherwise have been possible.

Steel Rise Expected . . . Although a selective steel price increase is expected by summer, end of price controls is not expected to foster a new wave of inflation. This was learned by IRON AGE editors interviewing more than 100 purchasing agents in a dozen industrial areas last week while Office of Price Stabilization was sloughing off price controls right and left.

Purchasing agents expect plenty of adjustments, up and down, as firms feel profit squeezes, or hot breath from their competitors. But they expressed elation at ending of controls, with no fear that prices would be generally headed upward.

Supplies Easier . . . With exception of a few critical materials such as steel, copper, aluminum, and some super alloys, most industrial materials are in better supply than had been realized. Industrial buyers expect even greater availability in the months ahead. They, at least, are keenly aware of the stellar role competition will play in their own industry as well as among their suppliers. They are counting on this factor to keep prices in line.

Wage Inflation Seen . . . Strongest inflationary force mentioned by the purchasing agents was the seventh wage round, already a factor by virtue of the many previously-bargained increases which had been pending before stabilization officials and which now automatically go into effect. These will be soon followed by other new wage agreements, including steel.

End of price control over steel scrap is expected to restore historic differentials between grades. It is anticipated that top grades of scrap may increase in price, while lower grades may decline.



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Market Briefs and Bulletins

Hot-top Short . . . Hot-topped steel remains an extremely critical item in the Midwest chiefly due to lack of soaking pit capacity to handle increased military castings. One mill is still setting aside 10,000 tons per month. Result is that hot-top users are downgrading their requirements in bar, sheet, and plate wherever possible. Inland Steel Co. is installing two soaking pits.

Bethlehem Head Predicts . . . Arthur B. Homer, president, Bethlehem Steel Co., this week predicted "real prosperity" for the nation in the years ahead. He said this prosperity would be based "not on inflation and arms but on greater productivity, more advanced technology and an equitable distribution." Bethlehem Pacific last week announced its 1952 steel production was 749,024 net tons or 90 pct of its strikeless 1951 output.

Blast Furnace In . . . Woodward Iron Co.'s No. 1 blast furnace at Woodward, Ala., out of service for repairs since Jan. 10, was back into operation this week.

Revises Prices . . . Reflecting drop in zinc prices, U. S. Steel Export Co. has revised export base prices of American standard pipe, English gas tubes, galvanized plain and barbed wire.

Earnings Correction . . . In the Feb. 5 issue of THE IRON AGE, p. 91, earnings shown for Rotary Electric Steel Co. were inadvertently transposed. They should have been listed as follows: Earnings for 1951, \$2,482,974; for 1952, \$1,843,064; fourth quarter 1951, \$328,042; and fourth quarter 1952 \$565,784.

Warehouse Stocks Mount . . . Steel warehouses in the East report overall inventories are about 65 pct of normal, but are still unbalanced. In shortage are: Bars, sheets, large rounds over 2 in., and heavy plates of more than 5/8 in. Wide flange beams are tight at present but are expected to ease soon.

Turns Waste to Copper . . . Recovery of millions of dollars worth of copper from copper mill waste piles is expected as a result of experiments conducted at Michigan State Engineering Experiment Station. Key to process is a new coal-tar product which removes copper silicate from impurities. Standard commercial processes must then be used to produce pure copper. In tests, recovery of copper silicate from samples has been as high as 90 pct, with 1 lb of the synthetic chemical removing up to 17 lb of copper silicate.

Poland's Output Up . . . Polish industrial production rose 20 pct during 1952, according to preliminary figures released by National Economic Planning Commission. Coal production reached a record 84.5 million tons, a 41 pct increase from 1947. Last year's pig iron production was 13 pct above 1951, steel was 14 pct ahead, and rolled products showed a 10 pct increase.

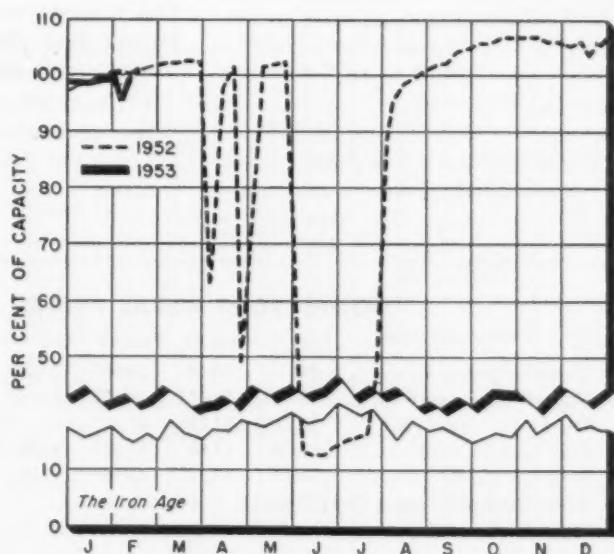
New Tool Steel Line . . . Crucible Steel Co. of America is now marketing hollow tool steel bars, designed to speed fabrication of ring-shaped parts. Stocks are now consigned to Chicago, Detroit, Cleveland, Syracuse, Philadelphia, New York, and Boston with other areas to follow.

STEEL OPERATIONS



District	Week of	Week of
	Feb. 15	Feb. 8
Pittsburgh	106.0	105.0*
Chicago	102.0	101.0
Philadelphia	97.0	97.0
Valley	101.0	100.0*
West	107.0	106.5*
Cleveland	97.0	96.0
Buffalo	94.0	94.0
Detroit	103.0	101.0*
Birmingham (South)	98.5	97.5
Wheeling	102.0	102.0*
South Ohio River	90.0	90.0
St. Louis	93.5	93.5
East	97.0	91.0
Aggregate	100.5	99.0

Beginning Jan. 1, 1953, operations are based on annual capacity of 117,522,-
* Revised
470 net tons.



Nonferrous Markets

Decontrol Throws Scrap Into Chaos

Aluminum, copper, brass, nickel scrap all higher . . . But few will say how much higher . . . Ingot makers won't quote aluminum prices till market settles—By R. L. Hatschek.

Price controls on nonferrous scrap, lead, tin, zinc, magnesium, and several minor metals, were junked last week. (See p. 69.) In some cases, the action didn't even cause a flicker on the market. But not scrap and secondary ingot.

Copper, brass, nickel and aluminum jolted upwards. How much the increases were was difficult to pin down early this week. Dealers were quoting about 5¢ per lb higher on copper, proportionately less on brass; 15¢ to 20¢ higher for nickel, up a few cents on Monel; and aluminum was really scrambled.

Confusion Reigns . . . General quotation was 3¢ to 4¢ higher on aluminum but dealers couldn't agree on where the market should be, according to the ingot makers. As a result, sellers of secondary aluminum ingot were refusing to quote prices.

One said his firm was even holding up shipments that were priced on a "date of shipment" basis—they didn't know what the price ought to be. Brass ingot is being sold on a "price at time of shipment" basis. New price lists were expected this week.

Copper Scrap . . . Custom smelters were quick to move, announc-

ing buying prices of 27¢ per lb for No. 1 copper wire, 25¢ for No. 2, and 23½¢ for light copper. But no moves were made in the price of copper refined from the scrap.

Dealers in New York said they'd pay 23¢ to 24¢ per lb for No. 1 heavy copper and wire, 22¢ to 23¢ for No. 2, and 20¢ to 21¢ for light copper. No. 1 composition went up to 19¢ or 20¢, with turnings 1¢ lower.

Most of the confusion should resolve itself this week.

Not an Eyelash . . . But Washington was more cautious in decontrolling the primary metals. Lead, tin and zinc were the major ones that slipped the ceiling yoke—lead and zinc were well under the lids and tin depends on the Reconstruction Finance Corp resale price rather than the "academic" ceiling.

Magnesium is still at its 24½¢ ceiling but it's a special case. The government's reactivated plants produce most of the light metal and the government is the major buyer. More than half of current production is stockpiled.

Primary copper and aluminum, Office of Price Stabilization says, are not yet "ready" for price decontrol.

Copper Doings . . . A couple other actions are of note in copper. First was the ending of copper rationing on a world basis. International Materials Conference, acknowledging that world supply and demand are about in balance, discontinued allocation as of Feb. 15. The agency will take another look at market conditions next month and will decide whether or not it will extend the exemption from allocation.

The other action was in the White House. Imported copper will continue flowing through U.S. ports duty-free as a result of President Eisenhower's signing of the duty suspension bill. The new law suspends the 2¢ per lb tariff through June 30, 1954. Final action was taken over mild opposition, as before.

Statistics . . . U. S. refined copper production totaled 108,010 tons in January, nearly 6000 tons off from December. Deliveries to fabricators slipped from December's total of 143,088 tons to 125,133 tons with a resultant increase in refined stocks to 59,836 tons. Copper Institute figures for members outside the U. S. showed similar trends, except that stocks of refined copper declined.

Nickel Ceiling . . . One metal still under ceilings is nickel. But OPS just boosted that ceiling for nickel products 3½¢ per lb to allow all sellers to charge the same price as International Nickel Co. and its distributors in the U. S. This is still one of the shortest of metals.

Reopen Antimony Smelter . . . The Stibnite, Idaho, antimony smelter of the Bradley Mining Co. may be reopened as a result of tentative plans. It's the biggest in the U. S. with a capacity of 4000 tons a year but only 25 pct of it would be used. It was closed last fall in the face of declining world market.

NONFERROUS METAL PRICES						
	Feb. 11	Feb. 12	Feb. 13	Feb. 14	Feb. 16	Feb. 17
Copper, electro, Conn. . .	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered . . .	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York . . .	\$1.21½	\$1.21½	\$1.21½	...	\$1.21½	\$1.21½*
Zinc, East St. Louis . . .	11.50	11.50	11.50	11.50	11.50	11.50
Lead, St. Louis . . .	13.30	13.30	13.30	13.30	13.30	13.30

Note: Quotations are going prices.

*Tentative.

Iron and Steel Scrap Markets

Prices Coast Along on Old Contracts

Little chaos arises on sudden end of price controls . . . Old orders keep OPS levels generally active for a while but re-adjustment of price structure will follow shortly.

On the strength of old contracts, the scrap iron and steel market skirted the pricing confusion that could have arisen with the sudden death of price controls. For the most part, scrap prices listed in THE IRON AGE at and below ceiling last week were converted to a delivered or brokers' buying price basis this week.

Scrap traders could see no drastic fluctuations in the prices of scrap but it was also virtually certain that some free market price differentials would be re-established. And it was expected that the demand strength of top steelmaking grades might inspire a price rise in that category—but this would come while some secondary grades slipped off a notch or so.

Cast, below ceilings for many months, remained unperturbed by the end of controls.

Neither was there confusion over the fate of contracts made under the controls setup. At press-time, there was no movement by mills to renegotiate these contracts. A few were rumored ready to renegotiate. But since a great many contracts were on a short-term basis most would likely escape renegotiation unscathed.

Pittsburgh—The shift from a controlled to a free market was accomplished with little pain in this district. For the most part scrap was flowing on the basis of contracts carrying OPS ceiling prices. Exceptions were machine shop and short turnings which carried prices based on sales, and cast grades some of which have been depressed for several months. IRON AGE prices for open hearth, electric furnace, and railroad grades were merely converted from a basing point to a delivered price. Concensus is that free market conditions will strengthen prices of top openhearth

and electric scrap, weaken secondary material.

Chicago—At press time differentials based on pre-OPS pricing had not emerged clearly, though the broker attitude was cautious. Railroad grades were moving strongly at ceiling, and there was some feeling that these grades would climb if anything did. Purchasers were committing on short term orders in most grades, though still buying openhearth at ceiling. Along with cast, blast furnace grades appeared weakest and a tumble seemed likely in the very near future on the latter grades.

Philadelphia—Inertia seems to be keeping scrap at its present levels. But trade opinion is that No. 1 heavy melting steel will rise to about \$45 to \$46 when some new business is done. No. 2 steel, dealers say, should remain about the same but No. 2 bundles are expected to drop. First reaction to price decontrol was a temporary stifling of the flow of No. 1 scrap. No. 2 grades continue to move but it's tough to get more orders on them.

New York—The market will soon readjust itself pricewise, the trade here was certain, but this step hadn't been taken early this week. Prices in the brand new free market coasted along on the strength of old orders placed during price controls. It was seen that No. 1 heavy melting would take its traditional differential to No. 2 and No. 2 bundles. Secondary grades might slip a notch. Many old contracts were reported short term in duration.

Detroit—Continued movement of top quality industrial scrap at the old ceiling price kept dealer scrap from climbing above old ceiling levels. Electric furnaces, however, are sure to bring No. 1 bundles up when the smoke clears away. Blast furnace grades continued to slump as did machine shop turnings. Apparently automotive companies, eager for steel, have decided to let scrap go at present

levels. Double purpose of this tactic is to stay in good with the mills and at the same time avoid contributing to increasing steelmaking costs.

Cleveland—Blast slipped below ceiling this week but otherwise the market was unaffected as controls went off. Dealers and brokers plan to honor present contracts and expect OPS prices to hold until the first of next month. When new contracts are signed pressure will be on No. 2 bundles and weak items such as cast and blast. Most dealers here expect good electric furnace grades to go up.

Birmingham—Most of the mills which made contracts for scrap at the beginning of the month will fulfill these contracts at the original price, according to advices received by brokers. One or two mills notified brokers they will take some additional scrap at the old prices if delivered by the end of the month. One southern mill is reported to have sent out notices that it will renegotiate contracts, but the largest buyer in the South says it will complete its contracts at the prices specified.

St. Louis—End of price controls found mills here in a strong inventory position. OPS prices continued to control the market. How long this basis will continue is uncertain but shipments are going out under old orders.

Cincinnati—Dealers here don't expect a flurry as trade moves into a free market. Blast furnace grades are expected to drop but heavy melting, new black sheet clippings and other strong items will be in demand at good prices. Inspection has already been stepped up and rejections are increasing.

Buffalo—Lifting of price controls resulted in little change in the trade here as dealers started the week with new business for steelmaking grades at the same levels. Buying gave dealers until Mar. 1 to ship.

Boston—Despite decontrol, most prices remained steady in New England. Only shift was in the already below-ceiling heavy breakable cast which is off another \$2.

West Coast—Scrap dropped again last week (See West Coast Report P. 83) and was just as hard to move as ever. Some shipments were being made at higher prices on old contracts.